The Mining Journal

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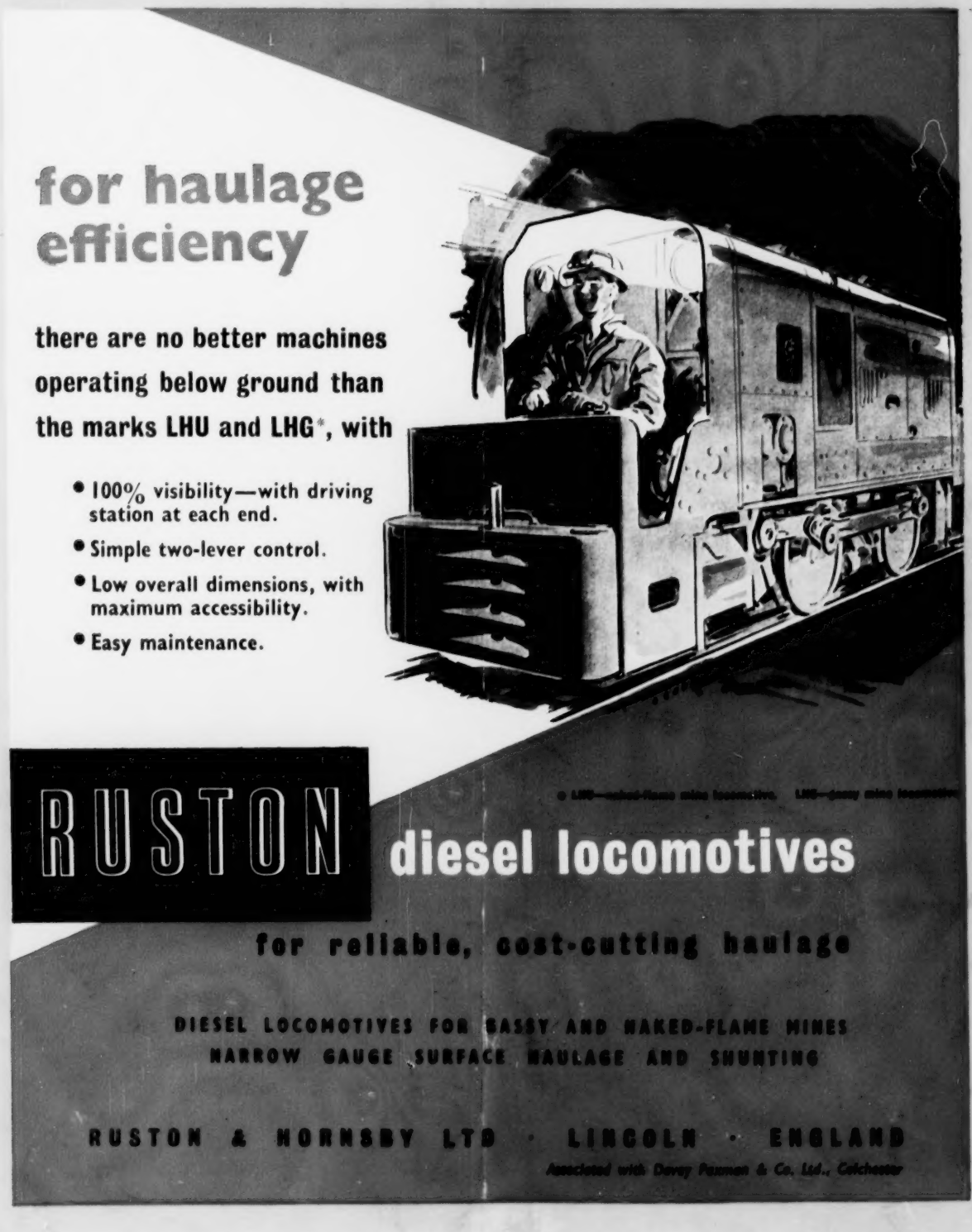
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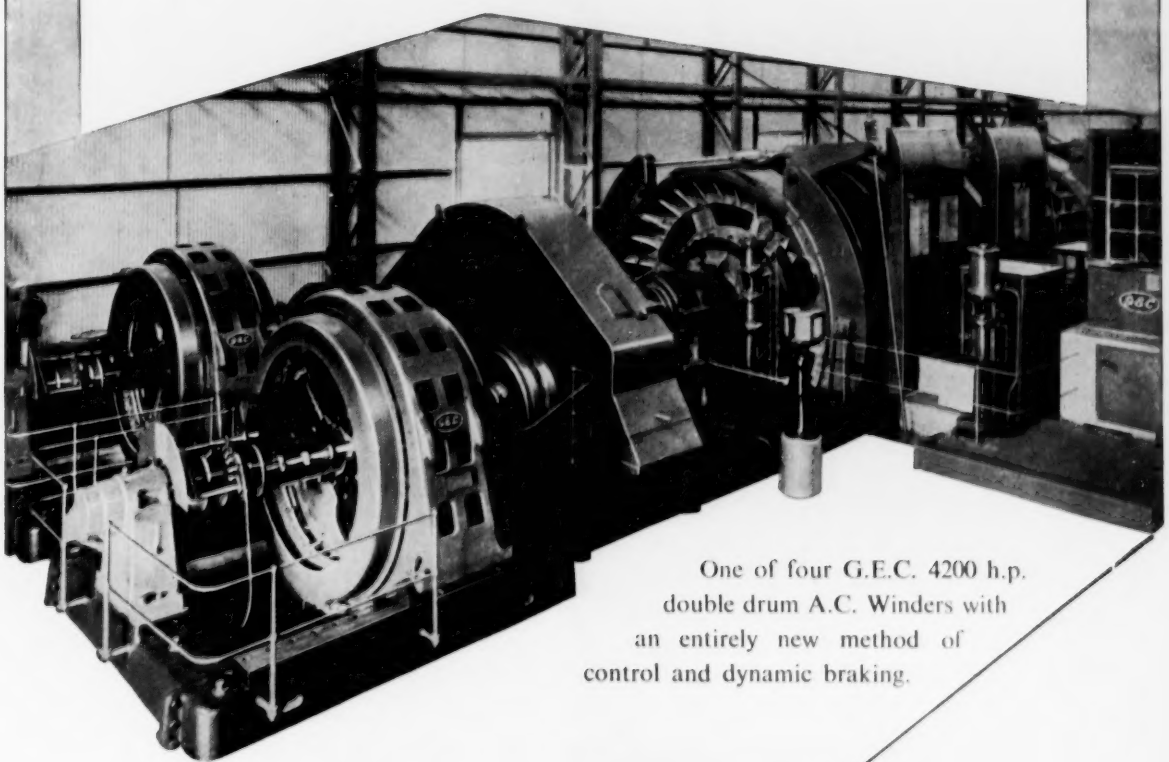

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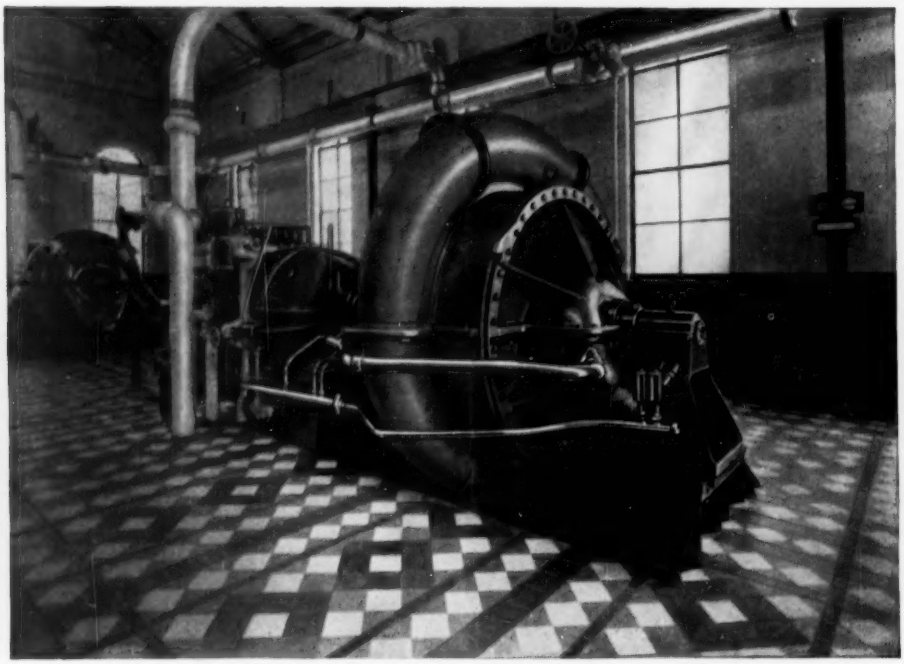

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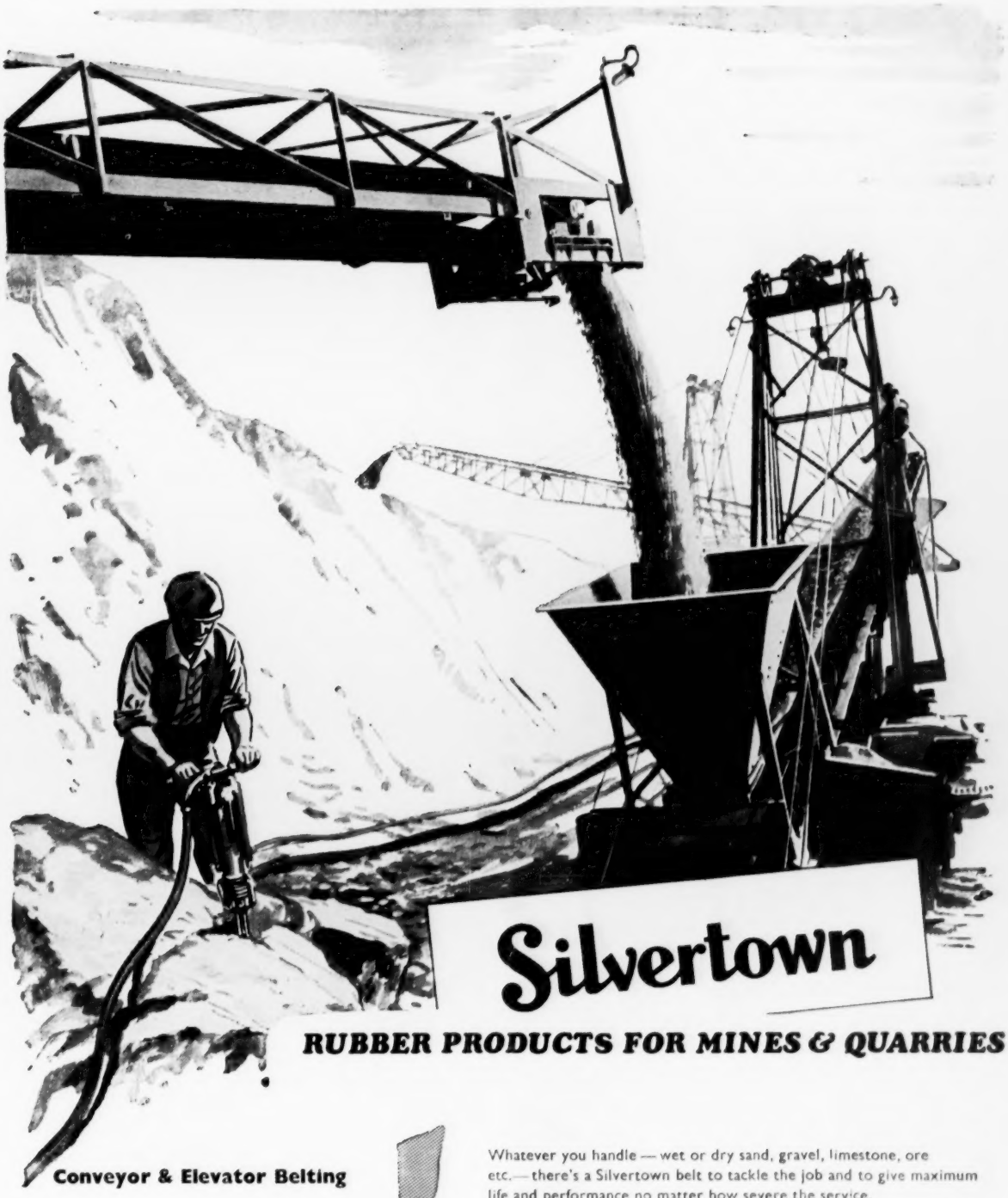

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Established 1835

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CONTENTS

Notes and Comments	**607**
Insatiable World Demand for Steel	**609**
Handling Overburden and Brown Coal by Bucket Wheel Excavators with Belt Conveyors	**610**
The Outlook for Lithium	**613**
Ore Dressing Plants in Hungary	**614**
Equipment for Handling Imported Ores	**615**
Machinery and Equipment	**616**
Metals, Minerals and Alloys	**617**
The Mining Markets	**619**
Company News and Views	**620**
Company Meetings and Announcements — Johannesburg Consolidated Investment Company Limited; Harmony Gold Mining Company Limited; Blyvooruitzicht Gold Mining Company Limited; Consolidated Main Reef Mines and Estate Limited; Rhodesian Anglo American Limited; Rhokana Corporation Limited; Roan Antelope Copper Mines Limited; Rhodesian Selection Trust Limited; Mufulira Copper Mines Limited; Wankie Colliery Company Limited; Waihi Investments and Exploration Limited; The Renong Tin Dredging Company Limited	**623**
Company Shorts	**630**

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NOTES AND COMMENTS

Spotlight on the Copperbelt

The overwhelming impressions that are left by a perusal of the series of company reports that have come out of Northern Rhodesia this week are of immense prosperity, and immense potential. The prosperity is the result of a year's most successful trading. It is true that copper reached its highest points this autumn and that the reports of the copper companies are taken only to June 30 ; it is true also that the Rhodesian Selection Trust group by a self-denying ordinance has chosen to market its copper in a way which has much reduced its gross income ; but these are only minor qualifications to the general picture of well-being. As the chairman of Roan Antelope Copper Mines was able to point out, its dividend is "the highest distribution yet made by the Company" in spite of the two month strike at the opening of 1955.

The potential is not in doubt either. There have been substantial additions to the Copperbelt's reserves, work is being pressed on to bring new capacity into production, and there is a general sense of optimism in the chairmen's reports both in the future of the industry and in that of the Federation.

But, of course, there are blemishes on this picture of apparently unlimited prosperity. The first is the matter of price. A prosperity that is based on unreal selling prices for the end-product is extremely precarious. It is one thing to make a handsome profit out of copper at £400 a ton ; it is quite another to drive away your own customers while you are doing it. The reports are alive to this problem. The chairman of Roan Antelope, because he has instituted a change in selling policy during the year, devotes much attention to it. He defines three causes of concern among copper consumers : the prevalence of strikes, the high level of prices and the instability of prices. Two of these problems are difficult to deal with, but the third he considered could be mitigated by quoting selling prices that would be stable over reasonable periods.

The issues that have divided R.S.T. and the Anglo American group are well known, but it is the greatest misfortune that there cannot be agreement between them on selling policy, since at the moment each group is in the position of sabotaging the other's objects. At the same time this is admittedly not the most appropriate moment for taking up final positions. Times are abnormal. If they were not R.S.T. would not have made the change that it did. Nevertheless it remains to be seen whether what appears to be abnormal now, is, in fact, the pattern that will come to seem normal in a few years time. Technological change and the scale of industrial activity may in time seriously detract from the usefulness of markets. However, that time is not yet and it is still possible intelligently to disagree on the role of the London Metal Exchange. Nevertheless the fact of disagreement is capable of causing strain both on the Copperbelt and among customers.

A second blemish is the threat of substitution. "I am confident" says the chairman of Rhokana, "that a firm demand for copper will continue in the future and that an increased world production can readily be absorbed." Nothing has been more remarkable in the past year than the persistence of the demand for copper, seemingly no matter to what price it rose. It is extremely difficult to know what ground copper has lost to alternatives as a result ; and quite as difficult to estimate what may be won back. At present the threat does not appear severe. If later copper were to face a period of uncertainty, the Copperbelt is as well equipped as any producing area to come through it. It can see prices down much further than can the big American producers, and can also compete with the Chilean output at least until the Chileans have put their affairs in order.

The third blemish is the possibility of strikes. In practice this danger is closely related to the problem of African advancement. The permanent inflation that afflicts Chile and the pace of wage claims in American manufacturing industries are both equally likely to cause strikes in these producing areas. True, neither of these problems is present in Rhodesia, but African advancement (although the problems surrounding its initial stages are now happily resolved), remains a potential cause of strife as grave as any facing the United States or Chile. For example, the enormous disparity between European and African wages remains an insoluble problem, as even if the Africans advanced sufficiently in responsibility and productivity to justify a closing of this gap, important social objections to such a change will remain. There is little in this week's company reports regarding the future problems that a biracial labour force will throw up. Indeed, that was not to be expected. A significant step forward has been taken in

the past year (the first real advance that has ever been made), and the reports are right to be self-congratulatory, and wise to require that what has been done should be safely digested.

This leads to the last thought prompted by the reports—the way in which the copper companies are leading on the Federation to full nationhood. It is not merely that they are—and will be for as far ahead as can be foreseen—much the greatest producers of wealth and earners of foreign exchange, nor that confident expansion programmes are in hand nor even that within "a measurable time" the Copperbelt may be the world's greatest source of copper. It is in the ancillary activities of the companies that their contribution seems to be so remarkable; notably in exploration outside the Copperbelt, in promoting technical and university education, in assisting railway development, in the promotion of agriculture, in the provision of housing, schools, medical services and hospitals, and in the beginning of town-planning in the new Copperbelt townships and the study of the related problems of land-ownership. In these, and other matters, the copper companies are setting the pace as only they can, and in doing so are greatly enhancing the feeling of confidence in the future of the Federation with all that that implies throughout the subcontinent. Providing only that the idea of a bi-racial society can be put into effective practice on the mines, the outlook for copper in Rhodesia is highly promising.

The Efficiency of African Labour

A theory which gained considerable acceptance in recent years—particularly in non-technical circles—was that the only solution to the labour problems of the South African gold mining industry lay in intensive mechanization. From time to time in these columns our Johannesburg correspondent has stressed the difficulties in the path of wholesale application, among them the problem of the layout of older mines and the shortage and cost of artisans needed for maintenance work.

In his latest despatch, on which this note is based, he points out that one particular aspect in which a great deal of success has been achieved is in the mechanical cleaning of shafts by making use of the cactus-type grab and as he remarks it is, therefore, surprising that the two latest world shaft-sinking records, first at Vaal Reefs and then at West Rand Consolidated, were achieved by use of manual cleaning methods. Admittedly, both these shafts were smaller than usual, but the actual footages achieved more than compensated for this factor.

The performances achieved at Vaal Reefs and West Rand Consolidated have focused attention on ways and means of increasing the productivity of the available labour force, both European and African, as these two records show what can be achieved by expert training and organization. In consequence, the question is being asked whether the training and organization revealed cannot be extended to cover all types of mining work. The general opinion here is that no great increase in labour supplies can be expected in the foreseeable future, and that the recruiting activities at best may merely maintain the *status quo*.

Some measure of training, particularly in respect of newly-recruited Africans, has been in force for some time, and each property has a study department concerned with efficiency on a broad basis. The tendency, however, is to devote more time not only to basic training but to an expansion of its scope, while at the same time efficiency in terms of the economics of mining and also costing will play a major part.

An increasing practice is the training of workers on surface in the particular techniques used on a particular property, for example in track and pipe laying, so that the operation becomes largely a reflex action when used underground. Results achieved so far have been most encouraging and show savings of time, labour and costs, while in addition delays through faulty workmanship have been reduced. A further interesting development has been the establishment of a standard method of lashing in which lashing boys have been trained on surface. This is one of the things which contributed to the shaft-sinking records, where a rate of lashing was maintained over the cleaning round capable of filling kibbles as fast as the hoists could handle them.

Recently, Mr. Charles Bedaux delivered a paper to the S.A. Institution of Mechanical Engineers on "The Role of Modern Management Methods in the Economic Development of South Africa". His most striking point was that the labour efficiency of South African workers as a whole was of the order of 40 per cent. If this is indeed the case, then it can only be assumed that the numerical side of the labour supply is relatively adequate, but that the problem lies rather in stepping up productivity.

The Supply of Mining Graduates

The annual dinner of the Royal School of Mines Association, which took place in London last Tuesday, provided as always, the occasion for a most happy reunion among old friends who from the nature of their work find themselves dispersed all over the world.

Of late years the principal speakers at these dinners have increasingly emphasized the need for more energetic recruitment measures to maintain the flow of trained mining graduates into the British overseas mining industry. This year the plea was taken up by Mr. J. Ivan Spens who, in proposing the health of the Association, gave it as his experience that it was far from easy to fill the mining scholarship places offered by his group—the London Tin Corporation. This, of course, has also been the experience of other companies, and while this year's intake into the mining department of the R.S.M. is showing up better than in recent years we would judge that existing facilities are as yet by no means at full stretch.

Aside from what has been done elsewhere in the Commonwealth, the recruitment of prospective mining graduates is now being tackled in this country with increasing energy. However, owing to the time lag resulting from the exigencies of National Service, coupled with the three- or four-year period of the mining courses themselves, it may well be another five years before the first fruits of even the furthest advanced of the new schemes will result in any noticeably increased intake into the industry from university level.

Competition from the National Coal Board, who offer half their 200 scholarships each year to sixth form school-leavers, is severe. Not only are these scholarships worth £300 a year or more, but it may well be, as Mr. Spens suggested in his speech, that the change in political climate in many parts of the world is dampening the spirit of adventure among those to whom a generation ago a career in mining overseas might have appealed.

Moreover, mining apart, the gap between the supply and demand for graduate scientists of all types appears to be widening, and there seems no reason to think that competitive bidding as between one industry and another will result in any differential advantage to mining. As we see it, not only have the terms of employment offered by overseas mining companies got to be as good as or better than those in other industries (which in general they are), but overseas mining has got to be imaginatively presented as a worthwhile and satisfying career in itself to schoolmasters, boys and parents to whom the realities of this profession are seldom familiar.

Insatiable World Demand for Steel

(From Our Iron and Steel Correspondent)

How much longer will the apparently insatiable demand for steel continue? This is the question uppermost in the minds of the leaders of the industry both in the old world and the new. After a slow start in the first half of the year, American ingot production has rapidly risen to unprecedented heights. In one week in November the actual output was 2,404,000 tons, equal to 99.6 per cent of rated capacity, and the big consumers continue to press for bigger supplies. Current opinion is that the firmness of the market quite definitely affords a basis for a further advance in prices, and it is now fairly certain that the all-time record U.S. output of 111,900,000 tons of steel attained in 1953 will be eclipsed by the end of 1955.

Precise figures of steel production in the Eastern *bloc* are unobtainable, but it is known that they are rising rapidly and will certainly exceed the 1953 record of 48,000,000 tons, and Western Germany, which produced 1,430,000 tons a month last year against Britain's 1,543,000 tons, has this year moved decisively ahead. In the first nine months of 1955 the West German plants turned out 15,500,000 tons of crude steel compared with a U.K. total of 14,600,000 tons and will almost certainly displace the U.K. as the third largest steel producer in the world to-day.

Yet still the list of steel users facing supply shortages in the coming year is said to be growing steadily, and many manufacturers have had to resort to rationing their customers to ensure equitable distributions of available supplies. Generally, consumers are taking all they can get and are asking for more.

Under these circumstances the Japanese Government is withholding licences for the export of certain types of iron and steel, some German exporters have closed their books at least temporarily, and British steel makers, besieged by supplications from home consumers for more generous deliveries, are unable to accept all the profitable overseas business on offer.

Australia has waived all import restrictions in favour of a free market in steel. The South African Railways Administration is in the market for 110,000 tons of steel rail. Canada has placed a £4,300,000 contract with a British firm for the supply of steel pipes. Venezuela has accepted an Italian tender for a new steel mill in the Matenza area and Mexico is planning a new integrated programme to expand steel production to double the present capacity of 600,000 tonnes.

As for India, the steel shortage there is so acute that import requirements are assessed at 1,000,000 tons in the ensuing year. The erection of new plant to raise steel capacity to 6,000,000 tons per annum has already begun but the expectation that the £82,000,000 contract for the building of a 1,000,000 ton plant would be placed with a British consortium is again in doubt owing to the report of fantastically favourable terms said to have been offered by Czechoslovakia.

BRITISH OUTPUT

Amidst all this impressive acceleration of demand and productivity the British steel industry is moving steadily forward to the attainment of its long fixed target of 22,500,000 tons of crude steel in 1958 or possibly a year earlier. Undeniably the makers have been caught short. Although production is now running at the rate of nearly 21,000,000 tons per annum and for the whole year may exceed the target of 19,500,000 tons, practically all the U.K. steel works are sold out for many months ahead and in some cases are refusing orders entirely until they have reduced the tonnages already on their books.

In these circumstances many consumers have been compelled to turn to the Continent and the U.S. for urgently needed supplies, despite the fact that imported material costs from 15 to 30 per cent more than the fixed home maximum. These imports, moreover, continue to increase.

During the first six months of this year finished steel imported direct by consumers was arriving at the rate of 55,000 tons a month; for the current half year the figure is expected to exceed 70,000 tons. In addition, centrally purchased imports of ingots and semi-finished steel have recently been averaging 174,000 tons a month and the total cost of steel imports has actually exceeded that of imported coal. The drain on our dollar reserves has become in fact an intolerable burden which can only be relieved by a more rapid expansion of production than was originally planned.

MEETING THE DEMAND

Fortunately, the portents for an achievement of this character are not unfavourable, chiefly because of the improvement in the availability of raw materials. Fears of an ore shortage have been dispelled. Imports which were running short have been speeded up to such an extent that by the end of September arrivals exceeded last year's figures for the nine months by approximately 500,000 tons.

Winter coal stocks are heavier than usual, and in the event of a shortage the steel industry has been given an assurance that its fuel requirements will be accorded special priority and it is significant that deliveries of home and imported scrap have improved to such an extent that the steady depletion of stocks has been arrested and their dimension increased.

In this respect the Iron and Steel Board has deemed it prudent to utter a word of caution. The Board points out that there may be some difficulty, during the coming winter, in securing full supplies of imported raw materials because of the additional calls on shipping for the import of other commodities, particularly coal.

But more new plant is nearing completion and very big development plans are in hand. United Steel has embarked upon new capital commitments of the order of £14,250,000. Dorman Longs have in hand a still more costly programme and it is expected that the Ravenscraig scheme of Messrs. Colvilles, estimated to cost £22,000,000, will be in operation two years hence with a capacity of 350,000 tons of pig iron and 400,000 tons of ingots per annum.

Planning for the still more distant future has also begun though it is still in its initial stages. Possibly consultations preliminary to the embarkation upon the huge capital expenditures involved, will embrace some discussions with the European Coal and Steel Community if only to lessen the risks of duplication or redundancy.

The British authorities have already established a system of close association with Luxembourg and it is significant that by the direction of President Eisenhower a United States Mission to the High Authority has also been appointed. Mr. W. Walton Butterworth, hitherto Minister and Deputy Chief of Mission in London, and a former United States Ambassador to Sweden, is the head of the Mission and is expected to arrive in Luxembourg in January next. U.S. membership of the Pool is not involved.

Handling Overburden and Brown Coal by Bucket Wheel Excavators with Belt Conveyors

By Dr ING. W. SCHARF

In *The Mining Journal* of October 21, 1955, an article describing the winning of brown coal by bucket wheel excavator in Western Germany pointed out that a feature of the Orenstein-Koppel und Lübecker Maschinenbau Aktiengesellschaft excavator employed was that loading operations were carried out simultaneously with spoil removal. The following article presents a yet broader view of bucket wheel excavator operation, in that it describes the working of these units in conjunction with belt conveyors in handling overburden and coal at the Bayerische Braunkohlen-Industrie A.G., Schwandorf, Western Germany. The author is Mining Director at Schwarndorf, where the winning of materials is carried out almost exclusively by means of excavators manufactured by Lubecker Maschinenbau-Gesellschaft

Characteristic of the brown coal deposits of the Bayerischen Braunkohlen-Industrie A.G. in Schwandorf, near Wackersdorf, are the long, narrow, deep depressions, frequently interbedded with sand and clay, in which the coal occurs.

In winning and conveying coal two problems are of special importance. First, the clean separation of the coal from the overburden and the interstratified argillaceous materials. Second, organizing the conveyance of the material from the troughs with depth up to 60 m. (196 ft.) in such manner that steep ascents can be overcome by the simplest means, and so that the means of conveyance can be shifted as rapidly and simply as possible, following the rapid progress of the work.

Bucket wheel excavator, type Rs 200/0.3 of the Lübecker Maschinenbau Aktiengesellschaft, excavating overburden

For winning the materials the bucket wheel excavator, approved in the German mining industry, was available, and for conveyance purposes belt conveyors.

USE OF BUCKET WHEEL EXCAVATORS

The winning of the materials is carried out almost exclusively by bucket wheel excavators manufactured by Lübecker Maschinenbau-Gesellschaft, Lübeck, and two of these of the type Rs 200/0.5 12 have a service weight of 180 tons each. An excavator of this kind is illustrated removing overburden. The material is delivered to the belt conveyor by way of a small hopper car.

Both devices working together in overburden of clay and sand were able to handle 11,000 to 12,000 cu. m. (14,390 to 15,700 cu. yd.) solids in the most favourable months in three shifts per day, the maximum daily output being 12,350 cu. m. (16,152 cu. yd.) solids. To avoid frequent moving of the conveying devices a crawler-mounted intermediate belt of the Lübecker Maschinenbau-Gesellschaft type R As 0/47.5 17.5 with a maximum useful length of 68 m. (223 ft.) is interposed between excavator and conveyor belt. It is possible to overcome distances from bucket wheel to conveyor device of up to 100 m. (328 ft.).

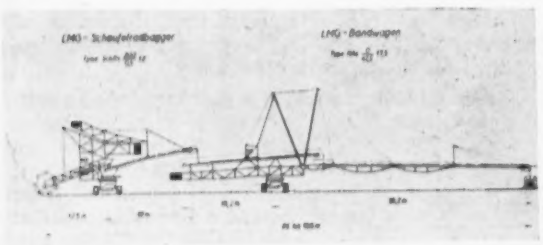
The illustration at bottom right shows the plant operating in combination in the open cast mine at Steinberg-Ost. Here the excavator transports the overburden to the intermediate belt which throws it by means of its boom, 47.5 m. (156 ft.) in length, into the worked out part of the mine. The coal seam is very faulty. In the foreground an intermediate conveyor on crawlers, with a conveyor length of 26 m. (85 ft.), manufactured by Weserhütte Otto Wolff, Bad Oeynhausen, is visible.

In order to satisfy the demand for increased output, a further bucket wheel excavator of the Lübecker Maschinenbau-Gesellschaft, type Rs 300/2.3 21 x 6 was ordered. This excavator, with a service weight of 870 tons will, on favourable ground, achieve an output of 1,000 cu. m. (1,308 cu. yd.) solids per hour at 60 discharges per min. The machine has a thrust of 6 m. (19 ft. 8 in.), making it possible to win the various strata separately up to an excavation height of 16 m. (52 ft.) The maximum excavating height is 21 m. (68 ft.). With an average ground pressure of 0.86 kg./cm.^{2} (12.23 lb./sq. in.) any sinking of the excavator is hardly noticeable even into the most unfavourable moisture-laden, sandy, and clayey soil.

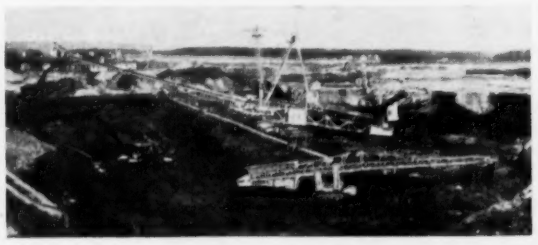
VALUE OF BELT CONVEYORS

The good results obtained with conveyor belt systems since 1951 have led to an ever increasing changeover to working with belt conveyors. At present about 7,000 m. (7,655 yd.) of conveyor belts are in operation.

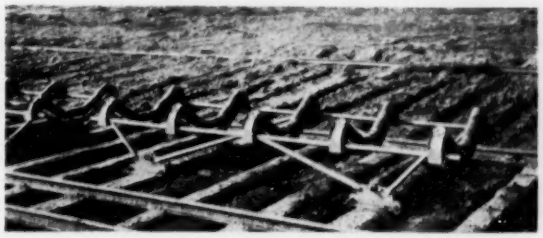
The conveyor belt systems concerned are mainly 1,000 mm. (3 ft. 3 in.) wide types manufactured by Eickhoff



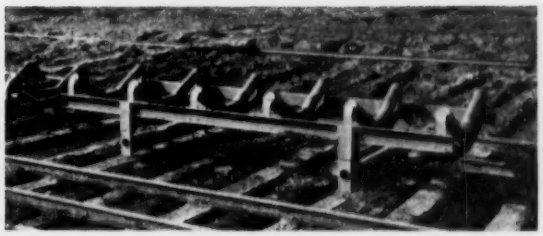
LMG bucket wheel excavator, type Sch. Rs 200/0.5, 12, and LMG crawler mounted intermediate loader type RAs 0/47.5, 17.5



The spreader of the Lübecker Maschinenbau Aktiengesellschaft dumping overburden from bucket wheel into open pit



Belt supporting frames manufactured by Eickhoff and by Frölich and Klüpfel for conveyor belts 1,200 mm. in width



Belt supporting frames manufactured by Friedrich Krupp in Rheinshausen for conveyor belts 1,200 mm. in width

(Bochum), Frölich and Klüpfel (Wuppertal), and Friedrich Krupp (Rheinhausen). The speeds of the conveyor belts vary according to the size of the plant; a belt speed of 4 m. (13 ft. 1 in.) per sec. adapted to the top capacity of the device having proved appropriate. A maximum output of over 1,000 cu. m. (1,308 cu. yd.) solids per hour was determined when conveying sandy overburden at this speed. Working with two excavators, an average of 11,000 to 12,000 cu. m. solids per working day of three shifts was achieved.

DISTRIBUTION OF MATERIALS

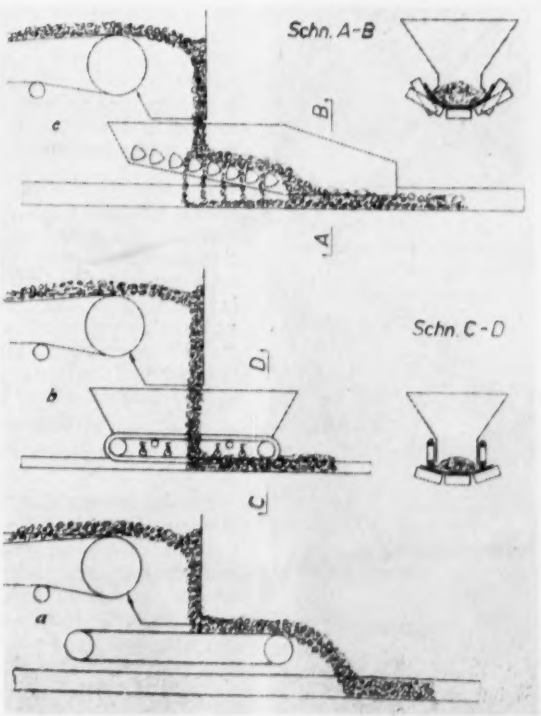
As the belt conveyors convey overburden and coal alternately, allowances had to be made for the possibility of distributing the materials conveyed to several belt conveyors. These various possibilities were met by distribution by swivel arms, reversing bands, and telescopic discharging drums. All these possibilities have been tested at the Bayerischen Braunkohlen-Industrie A.G. and all three have their advantages according to prevailing conditions.

After putting the large bucket wheel excavator into service, conveyors with a width of 1,200 mm. (3 ft. 11 in.) had to be chosen for the overburden-collecting belt conveyor leading to the dumping point, as the 1,000 mm. (3 ft. 3 in.) types were no longer adequate for conveying the output of the large and small excavator simultaneously.

For the coal-collecting belt conveyor along the ditch bunker preference was also given to 1,200 mm. wide belts.

In this case, carrying frames of tubular construction were chosen. These frames are similar to those for belt conveyors of 1,000 mm. width in that they are easily assembled and can readily be moved. They are composed of individual frames which can be laid down in series without the necessity for any interconnection. These constructions were developed in co-operation with the firms of Eickhoff and Frölich and Klüpfel.

The belt conveyors are operated by double drum drives, each drum being driven independently by a squirrel cage induction motor via a Voith-Sinclair clutch. For lengths over 400 m. (437 yd.) weight-loaded tension stations are necessary, at which the fixed drum can be driven additionally if required. A drive of this type with built-in tension station and with a capacity of 3 x 100 kW was shown by the Eickhoff company at the mining exhibition in Essen before erection in Wackersdorf.



Designs of transfer chutes, showing sectional views A-B and C-D

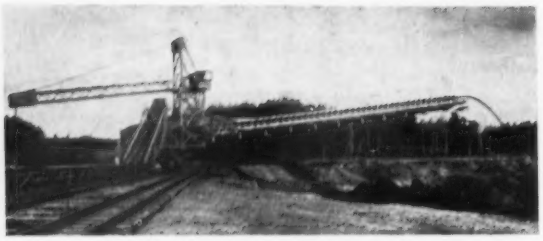
TRANSFER BETWEEN BELTS

Of special interest are the points of transfer, as it is important that the material is transferred to the next belt conveyor with care. Illustrated below are several solutions to this problem, in which the receiving belt is protected by interposing a baffle band (a) or a roller grate (c). In order to eliminate the influence of the rubber strips a proposal of the Phönix firm causes small rubber belts to circulate at the same speed as the belt (b).

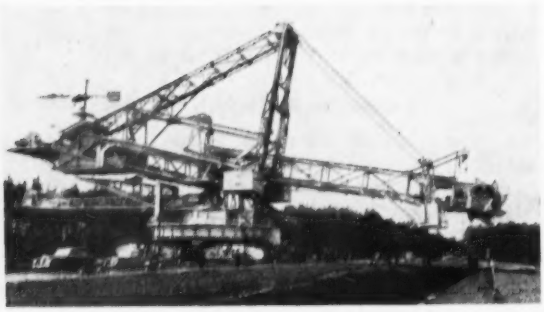
A further method of eliminating the influence of the rubber strips at the side of the hopper has also been developed by the BBI. At point of transfer the curve of the trough profile is increased to 60 deg. by the introduction of two further outer rollers, so that the resultant cross-section of trough is nearly semi-circular (View A-B). The lateral rubber strips may then have a distance of between 2 and 3 cm. (35/32 - 1⅛ in.) from the belt. Here, too, the speed of the belt is 4 m./sec. (13 ft. 1 in.), and permits a peak capacity of 1,700 cu. m/h (2,223 cu. yd.) solids (overburden, K=1.4).

The conveyor belts are in the form of bands with 4 to 5 plies of artificial silk and have a breaking strength of 100 tons. The plies themselves each have a strength of 220 to 280 kg./cm. (1,232 to 1,567 lb./in.). The rubber covering is 2 mm. (5/64 in.) thick on the runner side and 5 mm. (13/64 in.) on the carrying side.

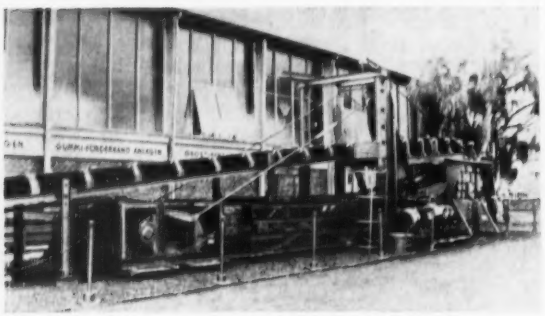
In the mines of the Bayerischen Braunkohlen - Industrie A.G., coal in the rough state is transported from the mining area with standard gauge trains. In order to avoid making the working of the excavator dependent on the railway traffic, a ditch bunker of 10,000 tons capacity was constructed in the coal bed. The ditch bunker has a cross-section of 157 m.² (188 sq. yd.) with a useful length of approximately 85 m. (278 ft.). As take-up plant a bucket chain excavator produced in



Conveyor belt spreader, Lauchammer No. VI



Bucket wheel excavator type 300/2.3, 21 x 6 in motion over roadway



Eickhoff double drum drive with power-driven tension station for conveyor belts 1,200 mm. in width

View of ditch bunker with bunker excavator and collecting belt conveyors

1915, working with an unguided bucket chain, was put into service. A belt loop carriage with short dumping boom is attached to the excavator for charging the ditch bunker from the coal collecting belt-conveyor. The dumping belt can work at a speed of 4 m./sec. or 8 m./sec. (13 ft. 1 in. or 26 ft. 3 in.) in order to achieve a good filling section. As a result of the good filling of the 250 litre buckets obtained by employing the unguided bucket chain, the capacity of the take-up plant is 800 tons per hr. at 33 discharges per min.

LOW COSTS FOR BUNKER

The complete ditch bunker equipment necessitates considerably lower investment costs as compared with ditch bunker filling by conveying trains, as the total building costs for the heavy bridge construction are thereby eliminated. In the present case, the ditch bunker was excavated from the living coal deposit by the take-up plant itself, so that with the exception of the costs for adapting the excavator and laying the rail track, no additional costs ensued.

The overburden is dumped by a spreader made by Lauchhammer with a service weight of 200 tons and a boom of 50 m. (164 ft.). The boom consists of a pipe, made of pantal, with a wall thickness of 5 mm. (13/64 in.) and a diameter of 1.5 m. (4 ft. 11 in.). The speed of the discharge belt is 26 ft. 3 in./sec. (8 m./sec.), the dumping outreach being increased by about 10 m. (32 ft.) by the dumping parabola.

ADVANTAGES OF BELT CONVEYOR

The special advantages of the belt conveyor in comparison with other means of conveyance may be summarized as overcoming gradients up to approximately 18 deg. By using chain or lid belts these gradients may even be increased to more than 40 deg. Simplicity and ease of adaptation are additional advantages, while small demands are made on the bearing strength of the subsoil, e.g. in the case of argillaceous or muddy soils, on which work with railway tracks or vehicles would not be possible, and there is smooth running with no vibration of the subsoil. Easy passage is assured over and under roads, trenches, and tracks by the employment of structures of the simplest kind.

There is, in addition, the possibility of parallel shifting which, when conveying, shows technical and economic advantages as opposed to the slewing method, together with simplification of planning, as gradients and curve radii are no longer of decisive influence on the possibility of developing open cast mining. Disturbances caused by land slides and erosion are rapidly overcome, as it is possible to adapt the belt conveyors quickly to a new situation, while there is insensitiveness to frost, especially after moistening the belts with agricultural salt or caustic solution.

OTHER CONSIDERATIONS

Finally, low accident rate may be considered, especially in comparison with train traffic, silent working, easily controllable by modern means of telecommunication and by loud-speakers, and high output per person and per shift, also in cases of difficult excavating situations which can undoubtedly be increased by further development of the conveyor belt technique.

The high state of technical perfection reached by train service in the last half century and yet to be attained by systems operating with belt conveyors still makes it difficult for the latter, incompletely developed as it is, to enter into competition.

The Outlook for Lithium

The development of lithium as an industrial material has been hampered in the past by the limited amount of known deposits, the need for a lower price to stimulate industrial interest, and the absence of long-term research on potential applications, while interest in lithium as a nuclear material derived a further impetus from the United Nations "Atom for Peace" Conference, when various statements were made regarding the potentialities of fusion reactors. The following article should be read in conjunction with those of December 31 and January 7 last. It brings up to date all aspects of lithium to-day, namely occurrences, production and treatment as well as the price factor, of particular interest being the widening application of the metal in the industrial sphere.

The use of lithium in the production of hydrogen bombs has neither been confirmed nor denied, but it is known that the U.S. Government is interested in lithium. Scientists have stated that when a lithium atom is bombarded with a neutron, it forms helium and tritium, which reacts with deuterium to produce more helium and release immense amounts of energy, in either radiation or kinetic form. This fusion reaction, from which the hydrogen bomb derives its power, has been described as a possible source of safe, low-cost power in unlimited quantities.

Because of its high neutron capture cross section, lithium deuteride has also been investigated as a possible shielding device for fission reactors. Lithium metal appears to be potentially suitable as a heat transfer agent for nuclear use, but difficulties are presented by its reported high cost and corrosive nature.

Industrially, lithium continues to find its largest outlets in ceramics, greases and the chemical field, with promise of applications in air conditioning and refrigeration. A notable development in the U.S. is the rapidly increasing demand for lithium-bearing enamels for aluminium. It has been reported that the first aluminium company to embark on the production of enamelled aluminium will do so on a large scale and will consume up to 2,500 tons of lithium carbonate a year. Price reductions announced by the American Potash and Chemical Corporation for the 1956 contract year will cut the prices of lithium hydroxide and lithium carbonate to 80 c. and 82 c. per lb. respectively for carload lots (minimum, 2,000 lb.). These reductions, which are 10 per cent below previous offerings, are expected to have a highly stimulating effect on the use of lithium by numerous industries which have hesitated to incorporate this material in manufacturing processes because of the price factor.

IMPACT OF LARGE NEW DEPOSITS

So far as supplies of lithium-bearing minerals are concerned, the outlook has been radically changed in recent years by the discovery of very large deposits, notably in Canada and Southern Rhodesia. According to its president, Mr. H. W. Rogers, the Lithium Corporation of America has ore reserves in the United States and Canada which represent the equivalent of about 230,000 tons of lithium carbonate which provides the point of departure for the production of compounds and metals. This quantity would be sufficient to operate the company's plants at full capacity for about 20 years.

In the United States—by far the largest producer and consumer of lithium—the actual situation existing to-day appears to be obscure. The current production capacity, in terms of lithium carbonate, is placed at between 10,000 and 12,500 tons annually. On the other hand, consumption during 1955 has been authoritatively estimated at under 4,500 tons. The difference between these two figures is presumably accounted for by U.S. Government purchases, whether for research purposes or actual use. Maximum lithium metal capacity in the U.S. is believed to be in the region of 200 tons annually.

Since April, 1921, exports of lithium from the U.S. have been under control. Individual licences are required to export lithium alloys, ores and concentrates, or any minerals containing lithium, to destinations other than Canada. Lithium is apparently not being stockpiled by the U.S. Government.

DEVELOPMENT OF MINERAL RESOURCES

The world's resources of lithium minerals were reviewed in *The Mining Journal* about a year ago (December 31, 1954, p. 768, and January 7, 1955, pp. 12 and 13). This year, further prospecting has taken place and considerable progress has been made in opening up the newer sources of supply.

In the first six months of 1955, Southern Rhodesia produced 36,926 tons of lithium ores valued at £143,925, compared with 54,050 tons (value £282,020) in the whole of 1954. Producers in the Bikita district, 45 miles from Fort Victoria, where the largest high-grade deposits are situated, were reported to be seeking U.S. support for the construction of a railway line to link Fort Victoria with Umtali.

Rhodesian ores will be processed at San Antonio, Texas, by American Lithium Chemicals, Inc., a company which is jointly owned by the American Potash and Chemical Corporation and Bikita Minerals, Ltd. Production was expected to start towards the end of 1955 or early in 1956. Stockpiling of lepidolite from Bikita has been in progress at San Antonio for some time.

Mr. C. J. Hatty, Southern Rhodesia's Minister of the Treasury, said earlier this year that, in order to encourage the processing of lithium salts in Southern Rhodesia, the Government had now taken the step of guaranteeing to any reputable processor of lithium salts in the country that it would not allow all the ore to be exported but would ensure that local processors could obtain their requirements at local prices. By the end of 1956 the country would be supplying a significant quantity of lithium to customers overseas.

CANADA AND THE U.S.

In Canada nearly 100 companies or individuals are reported to be searching for lithium. The most advanced lithium operation in this Dominion is that of Quebec Lithium, which has a contract with the Lithium Corporation of America for delivery of 165 tons of lithium oxide daily for five years from its property in the LaCorne area of Quebec. Lithium Corporation has built a $7,000,000 plant in North Carolina to handle the production from Quebec Lithium and from its own Kings Mountain mine. Shaft sinking to a depth of 700 ft. has been completed and a mill with an initial capacity of 1,000 tons was expected to start production about November, 1955. Ore reserves are estimated to contain some 15,000,000 tons of 1.2 per cent lithia, which is sufficient for 45 years' production at the initial rate of 1,000 tons. Reports that up to 25 per cent aluminium silicate content has been found in Quebec Lithium's LaCorne ores have been confirmed, while Keyboycon Mines was reported to have plans for an aggressive programme of exploration on its claims in North-Western Quebec, where prospects for lithium are favourable.

Quebec Metallurgical Industries, a subsidiary of Ventures, has indirect control over LaCorne Lithium Mines,

which is diamond drilling in North-Eastern Quebec. Quebec Metallurgical Industries operates Metal Hydrides, of Beverly, Mass, who are producers of lithium hydride.

The Lithium Corporation of Canada is investigating the commercial possibilities of its property in Manitoba, where a lithium-bearing dyke explored by over 6,000 ft. of drilling contains reserves estimated at more than 1,000,000 tons of 1.44 lithium oxide to a depth of 700 ft. It is hoped to start production early in 1956.

The McKirdy region in North-West Ontario, though still relatively unknown, is believed by some prospectors to be among the most promising lithium areas in Canada, while attention has also been directed to Val d'Or in Quebec and to the Slave Lake and Yellowknife areas in the Northwest Territories. A dyke in the Yellowknife area, 3,000 ft. long and 25 ft. wide, was reported to be 40 per cent spodumene.

The most extensive known occurrences in the U.S. are those in the Kings Mountain district, N.C., where an area 25 miles long and about two miles wide is estimated to contain 4,000,000 s.ton units of 1.7 per cent Li_2O ore and 124,000,000 units of 1.3 per cent ore. Ore mined by the Lithium Corporation of America at Kings Mountain is processed at Bessemer City in the $7,000,000 plant previously mentioned. This plant was completed early in 1954 and produces lithium hydroxide from carbonate.

The largest U.S. producers of lithium chemicals are the Foote Mineral Co., whose reserves of mineable spodumene at Kings Mountain were estimated to amount in January, 1955, to more than 7,000,000 tons. Recent drilling has raised them beyond 10,000,000 tons. Foote's new plant at Sunbright, Va., was completed in 1953. Plant production at Sunbright has been greatly increased and further expansion is under way. The company has hitherto been responsible for the importation of one half of all ores shipped to the U.S. from Africa.

The company has reduced prices on the basic product of its lithium processing operations. The changes were effective from November 7 and reduce the contract price of lithium hydroxide monohydrate from 90 c. to 80 c. a lb. and the spot price from 90½ c. to 80½ c. a lb. These prices are for truckload or carload shipments, with smaller quantities scaling higher. Foote gave no reason for the price cut. However, the move follows price reductions by other producers.

The Black Hills area in South Dakota is estimated to contain 1,000,000 units of Li_2O. This area was formerly the main source of ore supply for the Lithium Corporation of America but has been affected by lower transport costs.

It was recently announced that early in 1956 the Lithium Corporation's mining operations in South Dakota would be placed on a "stand-by" basis, because the company's stocks of spodumene were at a level sufficient for several months of refining operations.

PROCESSING METHODS AND COSTS

The leading U.S. producers of lithium compounds and metal are now favourably situated in regard to ore supplies and are interested only in deposits which are both extensive and high in grade. The lower limit of payability is placed at 1 per cent Li_2O, but even a rich deposit must be situated in an accessible region and close to a market. In the existing state of technological knowledge, the prices currently ruling for lithium compounds and metals are too low to permit the economic mining and refining of low grade ores.

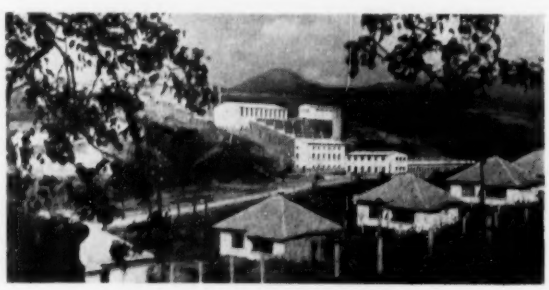
Based on a 60 per cent recovery from 1 per cent Li_2O ore in the initial phase of mining and milling, the *Engineering and Mining Journal* calculates that the cost per ton of concentrate would be $50 - $70 per ton concentrate, plus shipping costs. This calculation assumed a cost of $5 - $7 per ton of mill feed and a concentration ratio of 6 to 1. At a later stage milling recovery might rise to 80 - 90 per cent. At 80 per cent milling recovery, with about 8 tons of ore milled, the cost would be $40 - $56 per ton concentrate, plus shipping costs, and the purchase price of the concentrates would be $66 - $72 per ton. Shipping costs must therefore be low if the proposition is to be economic. Open pit costs are, of course, lower than those of an underground mining operation.

A variety of methods are employed for the chemical extraction of lithium from ores or concentrates. Equipment costs are high and considerable capital is required. Refinery processes whose end product is lithium hydroxide are limited to the production of that compound or must convert it at considerable difficulty and expense to the carbonate, from which all the other lithium compounds are normally formed. Refining methods that have $LiSO_4$ as the end product can go on to produce all the compounds at present available.

Refining methods that have lithium chloride as the end product can be used for the production of metal and metal derivatives, but not for carbonate. The method currently used by Foote Mineral and the Lithium Corporation of America involves electrolytic reduction from a fused salt of lithium chloride and potassium chloride. A bright iron cathode and a graphite anode are used. When lithium metal better than 98 per cent is required, the metal must be refluxed in vacuum to drive off the sodium and barium impurities. For the production of metal and metal derivatives it is cheaper to go directly from spodumene to the chloride than to use a spodumene-carbonate-chloride method.

Ore Dressing Plants in Hungary

The ore dressing plant at Gyöngyösoroszi, Hungary, was opened on September 3, 1955. The plant will save several million of florints' worth of foreign currency by reducing the importation of lead and zinc into the country. Construction of the plant was begun in 1952, and ore is hauled by diesel locomotive over a pull distance of 3½ kms. The Gyöngyösoroszi plant cost £2,100,000.



The ore dressing plant at Gyöngyösoroszi

The plant consists of the office building, flotation plant, and mills. In the mill, the ore is first crushed to 10 mm. and while wet is further treated in the ball mill. When finely ground, the lead and zinc ore is separated, first by flotation and later by chemical treatment.

A second ore dressing plant is to be erected at Rudabánya in north-east Hungary near the Czechoslovak border. The plant will process the large deposits of low-grade siderite found in the area. When the plant is completed in 1958 and operations begin, it might be possible to raise Hungarian ore production by 2½ times.

ORE HANDLING—I.

Equipment for Handling Imported Ores

In order to meet the steady increase in ore requirements arising from the First Post-War Development Plan, a special company, B.I.S.C. (Ore) Ltd., was established by the companies in the British steel industry to import iron ore for the industry on a co-operative basis. It is estimated that 12,000,000 tons of iron and manganese ore were imported into the United Kingdom during 1954, while further substantial increases in shipments are anticipated in the next three years. The speed and economy with which these ores can be transported from ship to quayside and from quayside to blast furnace are major factors affecting British iron and steel production, and in the following article, the first instalment of which appears herewith, some of the findings are discussed which have arisen from the investigations on imported ore handling undertaken for the steel industry by the British Iron and Steel Research Association.

The density of imported ores varies between limits of approximately 120 and 200 lb. per cu. ft., the average being about 150 lb. per cu. ft. Because of this very high density, which is much greater than that of other bulk mineral cargoes, it has been necessary to develop special equipment for discharging ore carriers arriving at British ports. B.I.S.R.A. has made a close study of the appliances available for handling iron ore and of the mechanical grabs used in ports and stockyards. While the investigators were concerned primarily with unloading cargoes and transporting the material from docks to iron and steel works, many of their findings are applicable to handling problems at the port of shipment.

The information resulting from this investigation and its impact on ore handling methods generally will also be of value, directly or indirectly, to all mining companies concerned with the shipment of ores to the United Kingdom.

PHYSICAL PROPERTIES OF ORES

The selection of equipment for handling imported ores is complicated by the wide divergency in physical properties, other than density, which are encountered in ores from different sources, due to variations in grinding procedure at the mines. Lumps up to 18-20 in. in diameter are found in materials such as Ouenza ore from North Africa, which are shipped as run-of-mine. On the other hand, crushing and grading produces a more uniform material with lumps seldom more than 6 in., as in Swedish ores. Crushing and screening also yields a fine material (less than ¼ in.) which is being imported in increasing quantities for further treatment in sintering plants. Still finer are such materials as Sierra Leone concentrates, which are enriched by fine crushing and separation of the iron-rich particles. A further variation is provided by a method of enrichment, adopted for some North Spanish ores, which does not break up all the lumps but produces a very dry ore, thus giving rise to a considerable dust nuisance during handling.

Other characteristics affecting the ease with which ores can be handled by grabs are hardness and the shape and texture of the lumps. Calcined ores crush easily, whereas Swedish ores have lumps so hard that they tend to remain wedged in the jaws while the finer material flows out. Some ores have lumps which are round and coarse in texture, but others present a difficult handling problem because the lumps are so smooth and slab-like that the jaws tend to slide over the ore instead of gripping it.

Although mechanical grabs have been used for many years, a survey by B.I.S.R.A. has shown that greater efficiency might be obtained by better design. Investigations into the mechanical properties of granular materials, together with theoretical studies of grab action and studies with model grabs, are being undertaken in co-operation with grab manufacturers.

Theoretical expressions have been obtained for clam shell and single-pivot wide span grabs—two of the three main types used in Britain for handling iron ore—showing the variation of the purchase and the resulting digging force as the grab closes. From these equations the various types of grabs can be directly compared and a relationship can be found between the forces exerted by a grab and the properties of the material handled.

Experiments are being carried out with model grabs to determine the influence of the various characteristics of a grab on its efficiency. The models used have been specially designed to allow the following features to be varied: Height, span, width and proportions of the grab; purchase (defined as the ratio of the horizontal component of the force at the jaw to the force in the closing ropes); weight and weight distribution; jaw shape and type of jaw edge.

To compare the results of the theoretical and small-scale studies with what happens in practice, a 30-ton rope tension recorder is being developed to record continuously the variations in tension in the closing rope of a full-size grab during the grabbing cycle.

Grabs used for discharging cargoes of imported ore must not only be suitable for handling materials having widely different physical characteristics; they must also be capable of serving many types of ships, ranging from large vessels specially designed for the ore-carrying trade to the multi-purpose ships traditionally used for this traffic, many of which are small and unsuitably designed.

Because of its high density, the ore loaded into a general cargo ship forms a cone which occupies only a small part of the hold space. The consequence is that, while the ore under the hatch is easily reached by the grab, much of the material below the decks is not readily accessible and the last of the cargo has always to be moved by hand or machine, to a position beneath the hatch, or it must be loaded into tubs. Normally about 20 per cent of the cargo is subjected to this additional handling operation, which is known as "trimming", but in a difficult ship the proportion trimmed may be as high as 40 per cent.

SPEED OF TRIMMING

Existing machines for mechanizing trimming are being studied by B.I.S.R.A. A new design employing a back-hoe which scrapes ore on to a conveyor belt carried by a straddle carrier has been patented, but its development is being deferred in view of the apparent success of a new design of overhead bucket loader which has recently become available. It is also proposed to carry out tests at an ore port with the slushing technique employed abroad. This method involves the use of large cable-drawn blades to move the ore to the centre of the hold, appropriate fittings being temporarily installed in the ship.

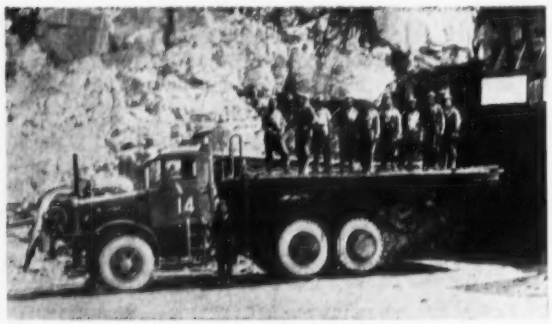
These developments may be expected to speed up trimming, which often takes so long that the first 70-80 per cent of the cargo is discharged in less time than the remaining 20-30 per cent. It is important, therefore, to choose grabs of a type and size which minimizes the amount to be trimmed.

By 1957 the steel industry will have a fleet of 15 vessels specially designed for the ore-carrying trade and having a total annual carrying capacity of about 2,225,000 tons.

MACHINERY AND EQUIPMENT

Lorry-Jumbo at Inco's Frood-Stobie Open Pit

In an engineering project unusual in open pit mining, The International Nickel Company of Canada Ltd., is driving two vehicular tunnels with a total length of 2,200 ft. in the walls of its Frood-Stobie open pit in the Sudbury district of Ontario to permit greater recovery of ore by low-cost surface methods.



The haulage truck converted into a drilling jumbo at Inco's Frood-Stobie open pit

The tunnels will take the place of sections of the main ramp road which winds for almost two miles around the sides of the open pit, now nearly 600 ft. deep. When the tunnels are completed, pit traffic will be routed through them, and the affected portions of the ramp road will disappear as the ore over which they lie is mined. The usual surface mining procedure of churn-drilling, blasting and trucking will be used to recover the ore beneath the ramp.

A drilling jumbo has been created by the conversion of a haulage truck, and is being used in driving the two tunnels. In the operational procedure, the vehicle is backed into position at the face. Three drillers stand on the rack with their machines, while four take up their positions beneath it.

The ore is comprised of a large block in the footwall, and a smaller block on the hangingwall. A total of 5,000,000 tons of ore is involved.

Originally it was planned to recover the ore by underground methods after all surface mining had been completed and the road was no longer required.

The tunnels will be 14 ft. wide and 15½ ft. high. They will be driven some distance inside the footwall and hangingwall but parallel to the ramp. The longer tunnel, in the footwall rock, will be 1,800 ft. long. The other tunnel, 400 ft. in length, will be driven in the hangingwall rock. Construction of the longer tunnel has begun and is proceeding at the rate of 100 ft. per week. When both are opened to traffic, trucks will move up through the 1,800 ft. leg, then come out at the south end of the open pit before entering the hangingwall tunnel. A smooth, safe flow of trucks hauling ore from the pit will be controlled by stop-and-go lights at the tunnel portals.

A Range of Insulation Testers

Four series of the Megger testers, manufactured by Evershed and Vignoles Ltd., are available for carrying out insulation resistance tests. The Series 1 tester ranges up to 200,000 megohms, 10,000 v., weighs from 24 to 60 lb. and is guaranteed for five years. The Series 2 tester ranges up to 2,000 megohms, 1,000 v., and weighs 7 to 9 lb. The Series 3 tester ranges up to 50 megohms, 500 v., and weighs 3 lb., while the Series 4 tester is of the same range as the Series 3 unit with the difference that it weighs 6 lb. Testers 1, 2 and 3 are all guaranteed for one year.

The instruments can be conveniently classified as single-purpose insulation resistance testers or dual-purpose insulation and conductor resistance testers. They may be hand driven, hand-and-motor driven, or mains operated.

The correct choice of an insulation resistance tester is primarily dependent upon three factors, namely the minimum voltage or pressure most suitable for testing the insulation, the maximum voltage which can be applied to the equipment under test without causing permanent harm to its insulation, and the capacity of the equipment under test.

Megger testers having test pressures of 500 v. or less are available as variable pressure or constant pressure instruments.

Rotary Type Roof Bolt Drilling Equipment

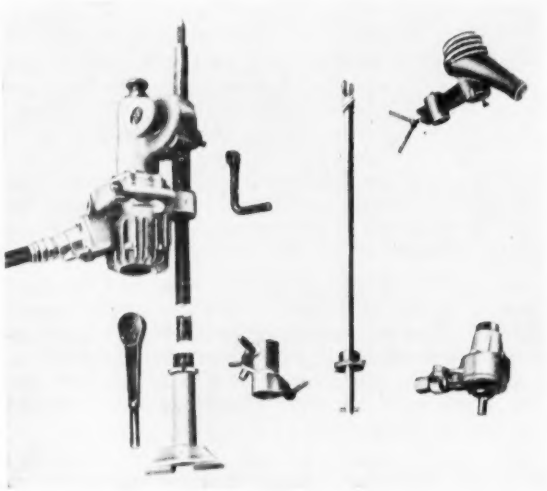
In these columns in our issue of November 18, 1955, a full description was given of the parallel-expanding roof bolts manufactured by Victor Products (Wallsend) Ltd. These bolts have been designed specifically for use with rotary drilling methods, and there follows a more complete description of the Victor rotary type roof bolt drilling equipment.

The Victor drilling equipment is designed for use close up to the working face, thus permitting the drilling of holes and the insertion of roof bolts at the earliest possible moment after the roof has been exposed.

The equipment consists of first, a feedbar, hand clamped in position between floor and roof, with a spring-loaded point to maintain rigidity of fixing. Second, a power feed type Victor rotary drilling machine, for 50 cycle or 150 cycle operation, or for use from compressed air supply. Third, a dust collector unit, fitting close up to the roof and diverting the chippings caused by drilling to a suitable collection point. This unit acts in addition as a forward guide for the drill rod. Four, a nut tightener attachment which fits into the chuck of the machine and tightens the bolt to a predetermined loading, when it automatically trips out. And fourth, the drill rod and rotary bit assembly.

The drill rod assembly comprises a smooth ¾ in. dia. rod with a short length of reamer rod to which is attached a tungsten carbide tipped rotary bit. With the machine working with the normal length of feed bar a 3 ft. 6 in. depth of hole can be drilled generally with one forward movement. With the hole at the required depth the dust collector unit is removed and the roof bolt inserted and tightened. Under normal conditions the equipment can be set up, a 4 ft. 6 in. hole drilled, the roof bolt inserted and tightened in 5 minutes.

The illustration shows the 50 cycle power feed type electric drill at top left, the feed bar assembly at bottom left, a ¾ in. dia. solid drill rod complete with reamer and dust seal bush at centre, the dust collector unit at top right and the nut tightener at bottom right.



Victor rotary type roof bolt drilling equipment

METALS, MINERALS AND ALLOYS

COPPER.—The change in sentiment (noted in this column last week) about the immediate outlook for copper supplies and prices in the United States has become more firmly established. There is no more talk of how long the producers are going to be able to keep their price up to the 43 c. per lb. mark. There is, it is true, no talk either that they will have to raise it; but it is clear that the long awaited decline in copper will not be ushered in with the New Year.

The producers have been sold out of 1955 copper at 43 c. for a long time now. Custom smelters are said still to be asking 46½ c. for December metal, but there is little if any of it left, and the dealers have been picking up 48 c. However, all this is of less importance than that these prices are holding good for January metal, and indeed, one custom smelter is understood to be selling at 46 c. for the entire first quarter. In short, there is a general (and justifiable) belief that the day for much cheaper and more plentiful copper is a bit further off than the optimists had hoped, but there is no cause for panic yet.

After all the latest copper production figures are encouraging. In October, mine output in the United States at 100,208 tons, and in the rest of the world at 145,462 tons, were both record figures. Taken with the available scrap supply they provided 10,000 tons more than the 246,898 tons that were delivered to users in October. When this copper passes through the pipeline—as it should do by the end of January there should be a significant improvement in the supply of metal. But it may not be enough and the ending of the shortage may have to wait till later in the first quarter at the earliest.

One reason why it may not be enough was provided by the B.D.S.A. last week. It raised from 8 to 9 per cent the proportion of mill space that will have to be given to filling military and Atomic Energy Commission contracts in the first quarter. Reserves of copper-base products in the first quarter of 1956 will total 58,000 s.tons, an increase of 4,000 s.tons over the "set-aside" for the third and fourth quarters of 1955. Of course this is not a disastrous increase but it serves as a reminder that industry also owes to Government inventory substantial quantities of copper and that this will have to be repaid. This notice may be taken as a hint that repayment will be required fairly soon.

From Rhodesia it is reported that the copper companies have decided after consultation with the Federal Government to ascertain the possibility of importing coal once more via Lobito Bay. During the next six months the companies will need 560,000 tons of coal. Present stocks are 45,000 tons and rail deliveries are running at a rate of 60,000 tons a month. The report adds, "even if the railway deliver 500,000 tons of coal during the next six months and wood burning is continued on the maximum scale, the supply will be inadequate to safeguard the mining companies' position during the months when maize and tobacco have to be moved. The stock of coal built up in this year's strike thus presumably is coming to an end, and with it a significant rise in fuel costs is started. From Chile persistent reports of impending labour troubles have been denied at least in the American-owned mines. There is, however, a strike at the Chagres mine 110 kilometres north of Santiago.

A curious statement from Santiago announces that an agreement has been made between the Chilean Copper Department's representatives in New York and Anaconda for regular sale of copper from Chuquicamata and Potrerillos to Europe. The agreement stipulates that these sales will be effected through a permanent contact between the Copper Department and the Anaconda Company. The aim is for the department to have direct contact with its customers and to keep an accurate check on the amount of copper shipped to European markets. This is a very odd statment indeed. First, the original copper law dealt with all American owned mines and it is difficult to see why this statement should be restricted to Anaconda. Secondly, it is only a matter of months since the sale of copper was passed to the copper companies; now it is being "effected" (whatever that may mean) by a "contact" (whoever that may be). Thirdly it was the object of the recent law to restrict to the companies "direct contact" with the customers; in any case since the old bank worked to a great extent through agents it never had very close contact with customers. Fourthly, why is it necessary to change the methods of sales to ascertain the destination of exported copper? Surely there are more effective methods of checking destinations and if the statement means anything at all they will have to be established in addition to these announced changes.

There has always been a mystery about how the Copper Department works in with the companies and this message does nothing to dispel it. Bache and Co., in its occasional letters has always represented the copper law as a gift to the copper companies yet the Copper Department has always maintained that by its own power it has ordered sales to Europe in the last few months because they were more profitable. Where does power lie? Why did the government fight so hard (this struggle delayed the bill by many months) to avoid having the sort of powers it seems to be wanting now? Is there reason to suppose that copper that should have come to Europe has, in fact, been traced to the United States? Is there anything else that could explain the need for an "accurate check". No doubt the explanation is not nearly so exciting as it is made to appear from this curious statement, but if people will issue curious statements they must expect other people to get curious about them.

LEAD.—The possibility of another increase in the price of lead is being openly talked of in the United States. It is said that all that is required is a hardening of the London quotation to no more than around 1½ c. discount; and lead has certainly firmed up in the last day or so on the L.M.E. Meanwhile, demand for lead in New York has been more than ordinarily active with battery makers keen buyers, and an actual shortage of metal may emerge. It is not considered likely that G.S.A. will be offered more than token amounts on its current essay into the market. The Association of American Battery Manufacturers at its annual meeting recently heard 1955 described as "unbelievable" and a forecast that 1956 would surpass it. Battery sales next year are expected to reach 33,800,000 of which 25,000,000 will be replacements.

It is reported from Canada that a lead-zinc ore deposit has been proved at Pine Point on the southern shore of Great Slave Lake. There are 60,000,000 tons of ore most of which could be got open-cast probably as cheaply as anywhere in the world. All that is required is a railway to take the concentrates from the Great Slave Lake to Grimshaw and thence by existing railway to Trail for smelting. Production could be as much as 10,000 tons of ore a day, though it would start at 1,000 a day. The new railway would be 430 miles long. Consolidated Mining and Smelting has a controlling interest in Pine Point.

TIN.—Although there are reports that tinplate stocks are growing at the American mills there is a keen interest in building up stocks of tin metal which is keeping prices up on both sides of the Atlantic. In fact the increase in tinplate at the mills is not counted of any significance and the outlook for tinplate consumption in 1956 is extremely good. Neither London nor New York is well stocked at the moment although London is rather more denuded. It seems that buying in the United States has picked up sharply following the rising price level in London. This in turn has raised the level in New York. Over a matter of 10 days spot Straits metal has moved from 96.50 to 99.37 c. per lb. but fell back to 99.25.

If political conditions in the Middle East and Malaya became noticeably quieter a good part of this rise would melt away. But so long as conditions appear unsettled it seems a good policy to Americans to build up stocks while they can because there is no doubt that 1956 will want them.

The future of both Malaya and Singapore should be clearer in a few weeks since both are sending missions to London to discuss constitutional advance. Meanwhile the negotiations between Tengku Abdul Rahman and the communists have reached a curious stage. For the time being all that is being discussed are the conditions under which talks should be held. Tengku has commendably determined not to treat with the Communists on equal terms. But no sooner was this clear than a new outbreak of terrorism occurred in what was supposed to be a cleared area. In the circumstances it is not certain with whom the initiative lies.

Malayan output of concentrates in October was 5,273 tons. Tin shipments from Singapore in the first half of November totalled 1,470 tons of which 100 tons went to U.K. options, 700 to the U.S.A. and 428 to Europe. Penang shipments in the same period were 1,728 tons, of which 180 went to the U.K., 1,075 to the U.S.A. and 260 to Europe.

ZINC.—Zinc has been in very good demand in the United States in the past week on the basis of 13 c. per lb. East St. Louis. The interest of steel mills in metal for galvanizing has been much stronger and the demand for special high grade has continued to be far in excess of possible supplies. It is

not now thought that special high grade can be much easier till well into the next year when increased refining capacity becomes available. G.S.A. is in the market for supplies but it is believed that only token offerings will be made. If this situation persists the possibility of another attempt to raise the price cannot be ruled out.

ALUMINIUM.—Following our remarks last week under Notes and Comments regarding the prospective expansion in U.S. aluminium production, we give below some more detailed estimates of the probable U.S. supply/demand picture for next year based on figures recently published by the *American Metal Markets*.

In addition to the 1,550,000 s.tons of primary production already forecast for next year, secondary production is expected to total 300,000 s.tons while imports are put at the assumed figure of 265,000 s.tons, making a total available supply of 2,115,000 s.tons. During the current year consumption requirements, exclusive of any stockpiling, look like working out at around 2,000,000 s.tons. Thus with demand rising all the time, supply and demand look like barely balancing next year, even if Washington continues to defer stockpiling. There are, however, at present no indications that the government intends either to halt stockpiling or to continue its deferments indefinitely. By the middle of next year something like 500,000 tons of deferred stockpile calls will have accumulated and, in addition to this backlog a normal stockpile offtake of about 125,000 tons a quarter is required, at any rate in theory.

If all these requirements were to be honoured during 1956 the stockpile would thus be drawing off some 750,000 tons, or about a third of the available metal. This is obviously absurd and we imagine that sooner or later aluminium stockpile programmes must be recast. Already there have been indications that Washington is showing more interest in building up productive capacity than in the stockpile. This is sensible enough. There has been no talk yet of stockpiling steel and obviously in an emergency non-essential uses both of steel and aluminium would be suppressed and military requirements served first. Stockpiling for strategic reasons is surely only necessary in the case either of metals for which the States is primarily dependent on imports from outside of the Western Hemisphere or for metals which may not be in sufficiently large supply under normal peace-time conditions to ensure ready availability through a sudden expansion of military demand.

COBALT.—Metals Exploration is reported to have discovered two new cobaltiferous areas in Queensland and to be negotiating with the Mining Corporation (Aust.) for the development of both sites.

SELENIUM.—The shortage of this metal in the States appears to be causing some embarrassment and earlier this week Mr. Honeywell, chief of B.D.S.A., called on T.V. and radio repair workers throughout the country to join in a salvage campaign. Supplies of selenium have been short for some time but the position has been aggravated by last summer's stoppages in the copper mining industry, which is the chief source of new selenium.

TITANIUM.—Associated Minerals Consolidated is extending its search for beach deposits of rutile. In addition to the prospecting authority it recently acquired over 7½ square miles on South Stradbroke Island, in Queensland, it has now been given a further authority covering some 68 square miles of Broadwater and southern Moreton Bay.

PLATINUM.—Of interest in the context of the high New York platinum price, which has remained during the past week at $97 to 195, are figures from the U.S. Bureau of Mines showing that imports of platinum and associated metals during the first six months of this year at 548,724 ounces totalled almost as much as during the whole of 1954, when imports amounted to 601,601 ounces. The Bureau also gives a detailed breakdown of imports by country for the first and second quarters of this year, but this is probably of little value as the exporting country is clearly in a number of cases not the country of origin. Thus, while less than 12,000 ounces are attributed to the U.S.S.R over the half year, Switzerland is credited with nearly 70,000 ounces and France with 62,000. It would be interesting to know just how much of the imports from these latter countries was of Russian origin.

The London Metal Market

(From Our Metal Exchange Correspondent)

The London copper market has fluctuated in rather uncertain fashion in recent days, but nevertheless owing to the existence of the "short" position mentioned last week it seems unlikely that there will be any great recession in prices yet awhile. Stocks of metal in London Metal Exchange warehouses registered a welcome increase of over 900 tons at the end of last week, but this it seems was not enough to narrow the backwardation appreciably. Consumption in Europe continues at a good level, while in America supplies of copper for early delivery are still tight and good prices are being obtained by customs smelters and dealers for December and first-quarter-1956 copper. The price of scrap there has been advanced ½ c. per lb. without bringing out much metal.

Tin has been a strong market, and, although there was a small increase in stocks in Metal Exchange official warehouses at the end of last week, these still remain at a very low level. Consumers in America have been taking more interest and prices there have advanced more or less in step with London. On Thursday morning the Eastern price was equivalent to £744 per ton c.i.f. Europe.

A feature in the lead market this week was a sudden jump in prices on Wednesday in anticipation of a rise in the American quotation. In Europe at the present time supplies are none too plentiful but without any signs of actual acute shortage.

Zinc has shown some firmness, especially for the current month, owing possibly to a technical shortage on the London market. Consumption is being well maintained on this side of the Atlantic.

Closing prices and turnovers are given in the following table :

	November 17		November 24	
	Buyers	*Sellers*	*Buyers*	*Sellers*
Copper				
Cash	£389	£390	£384½	£385
Three months	£377	£378	£374½	£375
Settlement	£390		£385	
Week's turnover	5,425 tons		6,300 tons	
Tin				
Cash	£793	£794	£775	£776
Three months	£770	£771	£765	£766
Settlement	£794		£776	
Week's turnover	925 tons		450 tons	
Lead				
Current half month	£108	£108½	£109½	£110
Three months	£107½	£107¾	£109¼	£109½
Week's turnover	6,525 tons		5,800 tons	
Zinc				
Current half month	£92	£92¼	£93	£93¼
Three months	£91¾	£91½	£91¾	£92
Week's turnover	6,475 tons		4,025 tons	

OTHER LONDON PRICES — NOVEMBER 24

METALS

Aluminium, 99.5%, £171 per ton
Antimony—
English (99%) delivered, 10 cwt. and over £210 per ton
Crude (70%) £200 per ton
Ore (60% basis) 23s. 6d./24s. 6d. nom. per unit, c.i.f.
Bismuth (min. 1 ton lots) 16s. lb. nom.
Cadmium 11s. 6d. lb.
Chromium, 6s. 11d./7s. 4d. lb.
Cobalt, 21s. lb.
Gold, 249s. 8½d.
Iridium, £30 oz. nom.
Manganese Metal (96%-98%) £269 according to quantity
Magnesium, 2s. 4d. lb.
Nickel, 99.5% (home trade) £519 per ton
Osmium, £24/27 oz. nom.
Osmiridium, £40 oz. nom.
Palladium, £7 10s./£8 0s. oz.
Platinum U.K. and Empire Refined £32 10s. oz. Imported £40 0s. oz.
Rhodium, £40.
Ruthenium, £17 oz.
Quicksilver, £90 0s. ex-warehouse
Selenium, 72s. nom. per lb.
Silver, 79½d. f.oz. spot and 79½d. f'd.
Tellurium, 15s./16s. lb.

ORES, ALLOYS, ETC.

Bismuth .. .. 30% 5s. 0d. c.i.f.
20% 3s. 3d. lb. c.i.f.
Chrome Ore—
Rhodesian Metallurgical (semi-friable) 48% £15 2s. 6d. per ton c.i.f.
,, Refractory 45% .. £14 2s. 6d. per ton c.i.f.
,, Smalls 42% .. £12 2s. 6d. per ton c.i.f.
Magnesite, ground calcined .. £26-£27 d/d
Magnesite, Raw .. .. £10-£11 d/d
Molybdenite (85% basis) .. 105s. 0d.-108s. 0d. per unit c.i.f.
Wolfram and Scheelite (65%) .. 242s. 6d./247s. 6d. c.i.f.
Tungsten Metal Powder (98% Min. W.) .. 19s. 10d. nom. per lb. (home)
Ferro-tungsten (80%-85%) .. 16s. 10d. nom. per lb. (home)
Carbide, 4-cwt. lots .. .. £39 3s. 9d. d/d per ton
Ferro-manganese, home .. £54 10s. 0d. per ton
Manganese Ore Indian c.i.f. Europe (46%-48%) basis 100s. freight .. .. 84d. per unit c.i.f.
Manganese Ore (38%-40%) .. 69d. per unit
Brass Wire .. .. .. 3s. 5½d. per lb. basis
Brass Tubes, solid drawn .. 2s. 10½d. per lb. basis

THE MINING MARKETS

After their persistent backward slide in recent months, there have been, during the past week or so, discernible signs of a recovery in the South African gold share market. The extent of the movement, measured against the previous fall, cannot so far be deemed important. Nor has turnover showed more than a very modest improvement. The fact remains, however, that there has been an upturn in prices and that business has been running above the abnormally low levels witnessed towards the end of last month.

For this change in sentiment the recovery in Free State Geduld may well have played an important part, for it remains true that this particular share, rightly or wrongly, is still very much a market leader. Even here, however, the recovery has not been wholly maintained, the shares having come back to 3¼ after touching 3 29/32 earlier in the week.

After the severe shake-out which has recently occurred in F.S. Geduld much importance so far as the immediate future is concerned is being attached to the company's first milling return which is expected to be in respect of December. At one time, it was thought that this could only make very disappointing reading, bearing in mind the high hopes which have always been held for this particular mine. More recent opinion, however, tends to the view that although the first return is unlikely to be exciting it will be not unsatisfactory and that in any case not too much importance should be given to the maiden operating return of any new mine. Meanwhile, according to reports, the current development indications are more hopeful and some observers are expecting a good quarterly next January.

Other O.F.S. mines have also generally made headway during the past week though not fully retaining earlier gains. After rising smartly towards the end of the previous week, Freddies have gradually relapsed to 8s. 3d., the market here not being helped by the statement at the Johnnies meeting that it is still not considered advisable for drilling results to be published in respect of the new area east of Venterspost in which Freddies and Johnnies are jointly interested. On the other hand, favourable reports continue to circulate concerning the possibilities of this area.

In the same group, Middle Wits also jumped into prominence at one time on the suggestion that the company is to be made the vehicle for Anglo-Transvaal Consolidated's entry into the new Bethal area lying east of the present Far East Rand in which Union Corporation is predominantly interested and where it is thought, at least two or three new mines will be floated.

Of Far Western Rand issues, Dominion Reefs have remained a firm market around 26s. 6d., the talk here being that the reported bear raid recently is now a matter of history and that meanwhile the company's profits during the current quarter so far have shown marked improvement on the maiden results in respect of the preceding quarter. There is, moreover, talk of a dividend of not less than 2s. per share next month.

Copper shares have not been greatly stimulated by the appearance of the Bancroft, Rhokana, Rhodesian Selection, Mufulira and Roan Antelope annual reports, encouraging though they were. Indeed, Bancroft have turned a dull market at 39s. on the intimation that the final cost of bringing the mine to its eventual production target of 85,600 tons of copper a year will be more than was originally estimated and that an additional £2,000,000 is likely to be required during the years 1958 and 1960.

On the other hand Magundi Mines have spurted ahead to 8s. on reports from Johannesburg that exploration of the North Charterland company's area in Northern Rhodesia, which is being undertaken by Magundi, has disclosed a new orebody having a strike length approaching two miles with assays ranging up to 16 per cent copper.

Tin shares have been providing a few good spots, helped by the continuing firmness of the metal price coupled with some good production figures. Ampat at 10s. 3d. and Sungwei Way at 7s. 10½d. have been notably firmer. With the fresh strength of the metal prices, lead-zinc issues have also been more to the fore, Lake George having moved up smartly to 15s. on consideration of the mine's recent gold outputs.

Elsewhere, Consolidated Murchison at around 3¼ have remained firm on reports that the company is continuing to do an exceptional business with its antimony production. A final dividend next month of at least 10s. per share is being looked for. This would make 16s. total for the year against 11s. 6d. in 1954.

Finance	Price Nov. 23	+ or — on week
African & European	3	
Anglo American Corpn.	8¼	+
Anglo-French	22/6	+ 6d
Anglo Transvaal Consol.	27/6	+ 1/3
Central Mining (£1 shrs)	43/6	+ 3d
Consolidated Goldfields	56/10½	+ 1½d
Consol. Mines Selection	38/9	
East Rand Consols	1/10½	
General Mining	4¼	+
H.E. Prop.	7/10½xd	+ 3d
Johnnies	41/6	+ 1/6
Rand Mines	3⅝	+
Rand Selection	43/1½	—7½d
Union Corporation	47/-	
Vereeniging Estates	4	+
Writs	38/1½	+ 7½d
West Wits	39/9	+ 1/3
Rand Gold		
Blyvoors	25/9	
Brakpan	6/9	
Buffelsfontein	35/6	+ 2/9
City Deep	12/-	+ 3d
Consol. Main Reef	21/3	
Crown	2½	+
Daggas	2⅜	+
Dominion Reefs	26/3	+ 1/3
Doornfontein	24/-	+ 9d
Durban Deep	31/10½	+ 7½d
E. Champs	4/6	+ 3d
E. Daggas	10/-	—3d
E. Geduld (4s. units)	30/9	+ 3d
E. Rand Props.	2⅜	+
Geduld	4	+
Govt. Areas	6/3	+ 1½d
Grootvlei	22/9	+ 1/-
Hartebeestfontein	37/9	+ 1/3
Libanon	8/-	
Luipaards Vlei	18/9	+ 9d
Marievale	21/6	+ 6d
New Kleinfontein	6/3	
New Pioneer	13/-	+ 1/-
Randfontein	48/9	+ 2/9
Robinson Deep	16/9	+ 3d
Rose Deep	10/6	
Simmer & Jack	4/-	
S.A. Lands	23/1½	
Springs	3/10½	
Stilfontein	27/-	+ 6d
Sub Nigel	37/6	
Vaal Reefs	32/-	+ 2/-
Van Dyk	3/6	
Venterspost	14/-	
Vlakfontein	18/-	
Vogelstruisbult	30/-	
West Driefontein	5	+

Rand Gold contd.	Price Nov. 23	+ or — on week
W. Rand Consolidated	38/9	
Western Reefs	36/3	+ 3d
O.F.S. Gold		
Freddies	8/6	+ 10½d
Freddies Consolidated	4/-	
F.S. Geduld	3½	+
Geoffries	15/-	+ 1/-
Harmony	28/9	—6d
Loraine	6/3	—6d
Lydenburg Estates	16/10½	+ 1/10½
Merriespruit	11/6	
Middle Wits	14/1½	+ 1/-
Ofsits	62/6	+ 3/-
President Brand	65/-	+ 7½d
President Steyn	35/9	+ 2/3
St. Helena	27/9	+ 1/-
Virginia Ord.	11/7½	—1½d
Welkom	18/3	+ 1/3
Western Holdings	3¼	+
West African Gold		
Amalgamated Banket	2/-	—1½d
Ariston	5/10½	+ 1½d
Ashanti	21/6	—1½d
Bibiani	4/-	
Bremang	1/7½	
G.C. Main Reef	2/6	—1½d
Konongo	2/3	—1/1½
Lyndhurst Deep	1/6	
Marlu	7½d.	—1½d
Taquah	1/7½	—3d
Western Selection	8/9	—1½d
Australian Gold		
Gold Mines of Kalgoorlie	12/6	+ 6d
Great Boulder Prop.	10/6	
Lake View & Star	16/3xd	—4½d
Mount Morgan	21/6	
North Kalgurli	6/9	
Sons of Gwalia	3/6	
Western Mining	9/-	
Miscellaneous Gold		
Cam & Motor	8/10½	—1½d
Champion Reef	5/9	
Falcon Mines	6/6	
Globe & Phoenix	25/-	+ 6d
G.F. Rhodesian	8/10½	+ 3d
Motapa	1/1½	
Mysoro	2/10½	—1½d
Nundydroog	8/-	+ 3d
Ooregum	4/3	—1½d
St. John d'El Rey	19/3	—1½d
Zams	55/7½	—1/10½

Diamonds and Platinum	Price Nov. 23	+ or — on week
Anglo American Inv.	9½	+ ½
Casts	28/6	—1/3
Cons. Diam. of S.W.A.	7½	
De Beers Defd. Bearer	6⅝	+
De Beers Pfd. Bearer	16½	+ ½
Pots Platinum	12/3	+ 6d
Watervaal	18/3	+ 9d
Copper		
Bancroft	40/-	
Chartered	76/-	+ 1/3
Esperanza	3/9	+ 9d
Messina	8½	
Nchanga	14⅜	+
Rhod-Anglo-American	5⅞	+
Rhod-Katanga	27/-	
Rhodesian Selection	48/-	+ 2/3
Rhokana	42	+ 1½
Rio Tinto	3½	½
Roan Antelope	25/4½	+ 4½d
Selection Trust	4½	+
Tanks	8⅛	—
Tharsis Sulphur Br	6¼	—
Tin (Eastern)		
Ayer Hitam	24/9	+ 6d
Gopeng	9/9	+ 9d
Hongkong	7/9	+ 3d
Ipoh	21/10½xd	
KanuKamunting	10/-	+ 3d
Kepong Dredging	3/4½xd	+ 1½o
Kinta Tin Mines	17/-	+ 1/-
Malayan Dredging	10/1½	+ 6d
Pahang	12/6	+ 4½d
Pengkalen	11/6	+ 1½d
Petaling	10/-	+ 7½d
Rambutan	22/-	+ 1/6
Siamese Tin	9/6	+ 7½d
Southern Kinta	17/9	+ 9d
S. Malayan	9/-	+ 9d
S. Tronoh	8/3	+ 4½d
Sungei Kinta	16/3	+ 6d
Tekka Taiping	8/10½	+ 1½d
Tronoh	9/1½	+ 6d
Tin (Nigerian and Miscellaneous)		
Amalgamated Tin	12/4½	+ 7½d
Beralt Tin	37/-	+ 1/-
Bisichi	5/4½	
British Tin Inv.	24/6	+ 9d
Ex-Lands Nigeria	2/6	
Geevor Tin	14/9	+ 3d

Tin (Nigerian and Miscellaneous) contd.	Price Nov. 23	+ or — on week
Gold & Base Metal	2/-	
Jantar Nigeria	7/3	+ 3d
Jos Tin Area	14/9	+ 3d
Kaduna Prospectors	2/-	
Kaluna Syndicate	3/-	
London Tin	9/3	+ 1½d
United Tin	1/9	—1½d
Silver, Lead, Zinc		
Broken Hill South	57/-	—6d
Burma Corporation	2/9	—1½d
Consol. Zinc	52/6xd	—1/-
Lake George	14/-	+ 9d
Mount Isa	61/9xd	+ 9d
New Broken Hill	40/9xd	
North Broken Hill	81/10½	+ 2/6
Rhodesian Broken Hill	14/1½	+ 9d
San Francisco Mines	26/3	—9d
Uruwira	5/10½	
Miscellaneous Base Metals and Coal		
Amal. Collieries of S.A.	51/3	
Associated Manganese	38/6	+ 2/10½
Cape Asbestos	10/-	
C.P. Manganese	32/6	+ 1/-
Consol. Murchison	65/-	+ 3/1½
Natal Navigation	3⅜	+
Turner & Newall	102/3	+ 1/6
Wankie	18/-	
Whitbank Colliery	5⅜	+
Canadian Mines		
Dome	$29	
Hollinger	$35¼	—¼
Hudson Bay Mining	$114	—8
International Nickel	$140½	—1½
Mining Corpn. of Canada	£8½	—½
Noranda	$92½	—2½
Quemont	£10	
Yukon	4/1½	
Oil		
Anglo-Iranian	5⅞	
Apex	32/3	+ 1/3
Attock	39/-	—1/-
Burmah	3½	+
Canadian Eagle	51/6	+ 2/-
Mexican Eagle	23/3	
Shell	7½	+ ½
Trinidad Leasehold	40/10½xd	+ 4½d
T.P.D.	27/6	+ 6d
Ultramar	33/9	+ 2/3

COMPANY NEWS AND VIEWS

Technical and Investment Merits of Copperbelt Companies

Full reports and accounts have been received from companies of the Anglo American and Rhodesian Selection Trust groups operating on the Copperbelt in Northern Rhodesia. While summarized statistics below give some idea of the tremendous technical strength of these extremely low cost producers, wider economic and political considerations intimately concerning the future of each of these companies—and indeed the newly federated territory itself—have been reviewed more fully under Notes and Comments on page 607 of this issue. In completion of the picture, readers will find abridged versions of Sir Ernest Oppenheimer's and Mr. R. L. Prain's speeches on pages 626, 627, 628 and 629.

From a purely financial standpoint one need not look very far to appreciate the great investment merit of these companies. And while it may be regarded as irrelevant at the present time to estimate that even with costs a £150 per ton present dividends could remain largely unchanged at, say a price of £300 for copper, this could well be the case.

Indeed, apart from a fall in share values which would—albeit unreasonably—follow a decline in the copper price (and for this reason the present time does not appear the most opportune at which to enter the market), there is no doubt that good returns are assured for many years to come.

Recent years have witnessed much idle—and so it has proved—incorrect speculation regarding the outlook for copper prices and in almost every case the pessimists have been proved wrong. Perhaps the main reason for the enduring strength of copper has been its strong statistical position in the electrical industries which provide its main outlet. In this sphere copper, by providing the highest degree of conductivity is—as yet—indispensable. It is in fact this attribute of conductivity that is seen by many as one of the metal's most important market factors.

In an era of swiftly rising living standards electricity must play an ever increasing part both in the home and in industry. Under these conditions, even if substitutes were to make inroads into some of copper's more ordinary uses foreseeable supplies of the metal have more than a good chance of continued full absorption.

Rho-Anglo's Higher Profits

Consolidated operating profits after charging depreciation made by Rhodesian Anglo American—the major Anglo group holding company on the Copperbelt—rose during the year ended June 30, 1955, to £26,413,070 from £23,695,850. After taxation of £9,863,824 (£8,288,124) an amount of £18,134,484 (£17,027,123) remained. This was further decreased by minority interests etc. to a total of £5,515,185 (£5,104,539) which was available for appropriation. A total of £1,064,447 (nil) was transferred to general reserve after which dividends absorbed £5,037,500 (£4,818,750). Unappropriated profits of £323,856 compared with £910,618 previously. Rho-Anglo's main holdings are represented by a stake of 52.397 per cent in the ordinary and "A" stock of Rhokana Corporation and 21.294 per cent of the equity of Nchanga Consolidated Copper Mines.

Rhokana's Increased Ore Reserves

In his speech to shareholders of Rhokana Corporation, Sir Ernest Oppenheimer emphasized that although production during the year ended June 30, 1955, had been adversely affected by a strike of African employees during the first quarter of 1955, the company had been able to make a record total net profit of £10,022,000. The fact that profits of £6,190,000 from mining operations were only £100,000 less than those of the previous year was to a considerable extent due to better prices for copper and to maintenance of limited production during the strike period.

Year to June 30	*Ore milled s. tons (000)*	*Grade recovered* %*	*Recovered Produced† l. tons*	*Sold l. tons*	*Ore Reserves s. tons (000)*	*Cu. %*
1955	3,618.0	2.55	71,288	71,864	100,499.3	3.16
1954	4,138.5	2.59	79,755	75,879	96,936.2	3.20

* Also 0.152 per cent cobalt (1953/54—0.154 per cent.)
† Made up of Blister 26,821 l. tons (26,837 l. tons). Electrolytic 44,467 l. tons (52,918 l. tons). Cobalt produced amounted to 871 s. tons of element in material (1,264 s. tons).

Reserves at the Nkana North section were substantially increased during the past financial year. This was due to the eventual inclusion of ore intersected by two diamond drill holes put down some years ago. Ore available at Nkana North accordingly increased to 30,990,800 s.tons from the previous figure of 23,876,600 tons. A reduction in reserves took place at Mindola Orebody to 49,965,100 s.tons from 52,213,700 s.tons but this was due to normal depletion.

Owing to its substantial holdings in Copperbelt mines Rhokana—besides being a large producer in its own right—also ranks as an important investment company. As at June 30, 1955, its interest in Nchanga Consolidated Copper Mines represented 33.6 per cent of that company's issued capital. Besides this, Rhokana has a stake in Bancroft Mines amounting to 47.2 per cent of the equity.

More Capital Needed for Bancroft

An interesting feature of the Bancroft Mines report and accounts for the year ended June 30, 1955, concerned the capital which will be needed to bring the mine into production at a rate of 85,600 l.tons of copper per annum by the beginning of 1960. Owing to unexpectedly difficult development conditions; increases in the cost of raw materials; and higher labour charges the original estimate of capital expenditure would now be exceeded. Moreover, the consulting engineers have recommended that the No. 1 shaft at the property should be deepened during the years 1958 and 1959 at a cost of approximately £500,000. It is, therefore, estimated that between 1958 and 1960 a further sum of approximately £2,000,000 will have to be provided either by appropriations from current profits or by other means.

R.S.T.'s Good Year

Consolidated profits of Rhodesian Selection Trust before taxation, which owns 63.98 per cent of Mufulira and provides the method by which public participation may be taken in that company—rose sharply during the year ended June 30, 1955, to £10,739,973 from £8,387,627 during the previous year. After taxation and the deduction of minority interests an amount of £4,288,134 as against £4,351,771 remained for appropriation. Of this figure general reserve received £892,629 as compared with £1,803,912 and dividends absorbed £3,357,531 (£2,316,058) leaving £15,168 to be carried forward (£209,350).

Apart from its holding in Mufulira, R. S. T. owns 64.29 per cent of Chibuluma Mines which has recently reached the production stage. Output of this property is to continue at an average rate of about 15,000 to 18,000 tons per month until initial stopes have been opened up. At that time the company will be in a position to hoist the rated capacity of 40,000 tons per month. Delays experienced at the mine have caused unforeseen expenditure. But it is hoped to avoid any call on shareholders to meet it. R.S.T. also owns 64.29 per cent of the Baluba and Chambishi Mines. Both of these are potentially large properties and work is proceeding with the object of increasing the knowledge, extent, and characteristics of the orebody.

Completion of Mufulira's Refinery Expected Soon

In his statement to shareholders of Mufulira Copper Mines, Mr. R. L. Prain, the chairman, referred to the company's electrolytic refinery which was expected to be completed in its entirety during the current year.

Year to June 30	*Ore Milled s.tons (000)*	*Grade Recovered %*	*Copper Produced* l. tons*	*Sold † l. tons*	*Ore Reserves Tons (000)*	*Cu. %*
1955	3,391.2	3.38	83,193	86,392	135,635.0	3.35
1954	3,616.0	3.24	90,299	84,467	132,065.0	3.48

* Represents 47,240 l. tons blister and 35,953 l. tons electrolytic cathode. (1953/54 53,911 l. tons of blister and 36,388 l. tons electrolytic cathode.)
† Represents 44,093 l. tons blister ; 29,286 l. tons electrolytic cathode and 9,777 l. tons electrolytic refined abroad. In addition 3,236 l. tons purchased from stocks released by U.K. government were sold. (Figures for 1953-54 were 37,474 l. tons blister, 31,222 l. tons electrolytic cathode and 15,771 l. tons electrolytic refined abroad.)
N.B.—The average cost of production per ton of all types of copper increased to £133 from £114 in 1953/54.

This means that the company will soon be able to use full facilities of the tankhouse and refined copper casting plant. The first wire bars were expected to be made early in 1956 and thereafter the refinery's capacity would very nearly match the capacity of Mufulira as a whole. In due course it is

expected that most commercial shapes of refined copper will be produced.

Roan Antelope's Muliashi Special Grant

Drilling at Roan Antelope Copper Mines continued during the year ended June 30, 1955, on the Muliashi special grant. In his statement to shareholders, Mr. R. L. Prain, the chairman, stated that this work might well have an important bearing on the future life of the mine. The question of ore reserves is, of course, of somewhat greater importance to Roan than to other mines on the copperbelt and the prospect of any substantial addition in the future will be eagerly anticipated. At all events, reserves were in fact increased during the past year by nearly 5,000,000 tons as a result of exploration by surface and underground boreholes in the Roan Extension area.

Year to June 30	*Milled tons* (000)	*Grade Recovered* %	*Copper Produced l. tons*	*Copper Sold* l. tons*	*Ore Reserves s. tons* (000)	*Ore Reserves Cu.* %
1955	5,099.6	2.16	82,696	82,982	90,213.0	3.20
1954	5,309.5	2.18	88,678	84,706	90,969.9	3.20

* Including 3,236 l. tons purchased from stocks released by the U.K. Government: A total of 16,445 l. tons were in the form of electrolytic refined abroad (1953/54—28,791 l. tons.)
N.B.—Average cost of production per ton of both blister and electrolytic increased to £142 from £126 in 1953/54.

Mr. Prain also referred to the property's new electrolytic refinery which is being constructed at Ndola. This is to be owned and operated by a subsidiary named Ndola Copper Refineries, the capital of which will be found as to two-thirds by Roan Antelope and one-third by British Insulated Callender's Cables. Much progress was made during the past year on this project which is expected to come into operation some time in the second half of 1958. The total cost is expected to come out at around £3,000,000.

Rise in Gold Fields' Cash Holdings

Total investments of New Consolidated Gold Fields (the wholly owned subsidiary of Consolidated Gold Fields of South Africa) as at June 30, 1955, appeared on its consolidated balance sheet at £10,806,310 as compared with £10,898,332 in respect of the previous year. Of this figure a sum of £9,767,881 (£9,643,118) referred to quoted holdings in or outside the United Kingdom. Unquoted securities together with "properties and ventures" totalled £1,038,429 (£1,255,214).

As at June 30, 1955, stock exchange value of the group's quoted securities at £23,413,280 showed a useful rise over the previous figure of £22,394,211.

Outstanding amongst consolidated balance sheet figures was that of cash holdings representing monies at bankers; Treasury Bills, and deposits at call with the National Finance Corporation of South Africa. Together these amounts represented £8,945,979 or a rise of £1,983,286 over the previous figure of £6,962,293. This reflected the advance in deposit accounts to £5,089,995 from £3,666,201 which appeared under current liabilities.

As previously reported, consolidated profits for the past financial year of New Consolidated Gold Fields before taxation rose to £2,353,492 from £2,281,808. After taxation of £1,052,548 (£904,498) net profits available were £1,300,944 (£1,377,310). A sum of £664,098 (£557,276) was placed to reserve and after dividends which absorbed £553,594 (£532,125), unappropriated profits carried forward advanced to £1,672,294 from £1,612,150.

Mr. Robert Annan is chairman. Meeting London, December 8.

Points from Statements by Chairmen of Gold Fields Companies

West Drie's Uranium Plant

In his statement to shareholders of West Driefontein Gold Mining Company, Mr. E. Stanley Hallett stated that the company's uranium plant would be ready to begin treating current slimes towards the end of the present financial year. However, as certain necessary alterations to the gold extraction plant could not be completed by that time it might be some months before the full effects of uranium production were reflected in operating results.

Libanon's Harvey-Watt shaft to cost £1,500,000

While referring to the reasons for extending Libanon Gold Mining Company's shaft system, Dr. W. J. Busschau, the chairman, stated that it was mainly this work which had been responsible for the present heavy capital expenditure. The new Harvey-Watt shaft would, he said, both ventilate the lower central portion of the mine and enable exploitation of the southern part of the property. Expenditure on the shaft, amounting to about £1,500,000 would, it was expected, be spread over six to seven years. Capital outlays would, therefore, continue at a high level for some years. Dr. Busschau also touched on the question of dividends. Unfortunately, he said, in the absence of a rise in the price of gold, future dividends would depend on costs the rising trend of which did not yet seem to have been arrested.

Exploratory stoping at Sub Nigel

According to Mr. E. S. Hallett, chairman of the Sub Nigel, further declines in yield must be expected in the future. Profits would, he said, depend largely upon results obtained from exploratory stoping. During the past fianacial year, Sub Nigel sold 67,600 shares in Spaarwater Gold Mining Company, thereby reducing its holding to 76,395 shares. The company's holding in Vlakfontein Gold Mining Company remained at 378,500 shares.

Difficulties at Venterspost's No. 1 Sub-Vertical

The delay in bringing No. 1 Sub-Vertical shaft at Venterspost Gold Mining Company into operation said Dr. S. J. Busschau, the chairman, had been due mainly to difficult ground. However, since the close of the past financial year equipment had been installed and the shaft was expected to come into operation during the first quarter of 1956. At that time development of the main pay shoots at depth in the No. 1 shaft area should begin. Referring to structural disturbances encountered in the final stages of sinking Dr. Busschau stated that a programme of diamond drilling and development would be undertaken to investigate the faulting. Should the dislocation prove to be the West Rand Fault, an appreciable loss of ground in the lower levels of the mine's north-eastern section would result.

Bird Reef operations at Luipaards Vlei

Mr. W. M. Barclay, the chairman of Luipaards Vlei Estates and Gold Mining Company, has told shareholders that although a lower milling rate and higher costs continued adversely to affect Main Reef Section profits, it was gratifying that Bird Reef development results had proved very encouraging. When the uranium plant was working to capacity, he said, profits from this source were likely to more than offset lower Main Reef Section profitability.

Delay expected in Driefontein's uranium operations

The uranium plant at West Driefontein which is to be used also by Doornfontein is expected to be ready for operations towards the end of the financial year ending June 30, 1956. However, as this time coincides with the completion of Doornfontein's third milling unit, and as certain alterations have to be made to the gold plant, it is likely, states Mr. E. Stanley Hallett, the chairman, that some months might elapse before the full eeffct of uranium production would be reflected in operation results.

Johnnies Hopes to Maintain Present Dividend Rate

Speaking at the meeting of Johannesburg Consolidated Investment Co. Mr. H. J. Joel, the chairman, expressed his satisfaction that notwithstanding the large amount which had been transferred to investment reserve in respect of the year ended June 30, 1955, it had been possible to pay a dividend only slightly reduced from that of the six previous years. He hoped that distribution could at least be maintained at the present level.

Mr. Joel referred to drilling being carried out on the farms Modderfontein No. 4, Waterpan No. 45 and Jachtfontein No. 99. Results obtained, he said, warranted the continuance of operations. But as the assessment of this area's potentialities presented a complicated geological problem it was not considered that shareholders' interests would be best served by providing periodical information which must for the present be regarded as incomplete and inconclusive.

Anglo-Vaal's Increased Investment Values

A considerable increase to £4,330,811 from £3,266,772 in the market value of quoted investments held by Anglo-Transvaal Consolidated Investment Company took place during the year ended June 30, 1955. In addition to this shares in subsidiary companies at or under cost shown at a balance sheet figure of £1,696,861 (£1,734,437) had a market valuation of £1,614,903 as compared with £1,346,362 at the end of June, 1954. Net liquid assets of the company amounted to about

£697,000. Cash holdings shown at £4,970,731 were more than double the previous year's figure of £2,041,361. This reflected loans at call from associated companies at £4,063,567 as compared with £1,507,244 previously.

During the past financial year net revenue from interest, commissions, fees etc. after expenses totalled £447,150 as compared with £345,409 during the preceding year. Dividends received rose to £346,823 from £333,555 and realizations of investments brought in £180,897 as against £220,652.

Year to June 30	*Total Revenue*	*Ex-penses†*	*Taxa-tion*	*Net Profit**	*Divi-dends*	*Carry Forward*
	£	£	£	£	£	£
1955	974,870	33,042	144,000	538,154	544,922	379,124
1954	899,616	25,260	165,000	529,203	544,922	383,892

* After £200,000 (£150,429) written off investments.
† Representing £6,155 (£4,072) depreciation and £26,887 (£21,188) options written off.

A survey of Anglo-Vaal's principal interests included with the company's report and accounts details some interesting developments in connection with Middle Witwatersrand (Western Areas). Discussions between this company; the Anglo-American Corporation of South Africa, Western Reefs Exploration and Development, Vaal Reefs Exploration and Mining have taken place regarding the formation of a company (the Zandpan Gold Mining Co.) to take transfer of a compact block of ground situated on the eastern portion of Klerksdorp Townlands held by Middle Wits. Portions of the farms Zandpan No. 43 and Palmietfontein No. 29 held by Vaal Reefs and Western Reefs respectively will also be included. Further drilling is proceeding in this area with a view to obtaining additional information.

Mr. S. G. Menell is chairman. Meeting Johannesburg, December 9.

New Wit Gold Exercises Saaiplaas Rights

In his statement to shareholders of New Witwatersrand Gold Exploration Co., Lt.-Col. R. L. Broad, the chairman, disclosed that since the end of the past financial year the company had exercised its direct and indirect rights to subscribe for shares in the initial working capital of Free State Saaiplaas Gold Mining Co.

Market valuation of New Wits' portfolio of quoted investments as at June 30, 1955, was £2,718,815. Of this total, dividend paying gold and gold uranium mining companies represented 19 per cent, while holdings in this category which were not yet dividend payers made up 58 per cent. Financial and exploration companies totalled 21 per cent and the remaining 2 per cent was invested in industrial concerns.

Klerksdorp Sells Dominion Reefs' Holdings

An important feature of Mr. Hedley Williams' statement to shareholders of Klerksdorp Consolidated Goldfields for the year ended June 30, 1955, concerned the realization of Dominion Reefs (Klerksdorp) holdings. This interest which previously amounted to 146,933 "A" shares, had been reduced to an "almost nominal" figure. Explaining the company's reasons for this sale, Mr. Williams emphasized that Klerksdorp Consolidated was primarily concerned in mining for its own account. It was essential for the company to explore its properties rather than retain a speculative interest in another concern. The sale of Dominion Reefs' shares had provided funds needed for this purpose.

During the past financial year Klerksdorp's exploratory and preliminary development work on Farm Rhenosterhoek No. 52 had been continued and extended. The programme had since progressed according to schedule.

Meeting, London, December 6.

Harmony Borehole Results

At the recent meeting of Harmony Gold Mining Co. it was stated that initial prospecting of the Basal reef by boreholes in the area between Nos. 2 and 3 shafts, had yielded some erratic results. Of 21 boreholes drilled so far the inclusive overall average had been 12.4 dwt. over a channel width of 28 in., equivalent to 347 in. dwt. It was, however, confidently expected that the borehole programme would show improved results as haulages advanced towards the No. 2 Shaft, which was located in an area where four boreholes drilled from the surface averaged 1,350 in. dwt.

Wankie to Reach 5,000,000 Tons Capacity by End 1956

In his address to shareholders of Wankie Colliery Co., Mr. T. Coulter, the chairman, reported that the company's development programme for coal production was well ahead of schedule. Present capacity, he said, from three collieries was already about 4,500,000 sales tons of coal per annum. This was some 900,000 tons above existing coal carrying capacity of the Rhodesia Railways.

Mr. Coulter stated that the company had no doubts about honouring the guarantee given to the Southern Rhodesia Government in 1953 that output capacity would be raised to not less than 5,000,000 tons a year by the end of 1956.

Partly reflecting improvements in coal carrying capacity and partly its expansion programme, Wankie produced 3,414,719 sales tons of coal (2,732,957 sales tons) during the year ended August 31, 1955. Coke output in sales tons was 220,966 tons (154,617 tons).

It was expected that the next 12 months should see the development and reconstruction programme virtually completed. Two years ago the cost of this project was estimated at £5,300,000 but it would now be nearer to £6,000,000. The additional funds could, however, be found from the company's own resources and further capital issues were unlikely.

During the past financial year, Wankie made a profit, after taxation, of £824,012 as against £424,202 previously. Dividends absorbed £386,094 (£330,938) and the unappropriated balance carried forward advanced to £87,918 from £11,736.

Meeting, Bulawayo, December 12.

Renong's Rasa Area

The fact that remaining high grade ground on the "Old Town" area at Rasa was worked out by Renong Tin Dredging Co.'s No. 2 dredge during the early months of its financial year ended June 30, 1955, reduced production of tin concentrates from this section to 549.71 tons of tin ore as compared with 967.2 tons previously.

A total of 177.88 tons of tin ore were produced by No. 3 dredge as compared with 124.3 tons. At the Jinjang mine, which is being worked jointly between Renong and Straits Tinfields output of tin ore totalled 766.6 tons during the dredge's first year of operation. Renong's share of production from this area amounted to 383.32 tons of tin ore.

Referring specifically to the position in No. 2 dredge area, Sir John Hay, in his statement to shareholders, emphasized that a lower tin content would mean lower output. The consequent diminution of earnings during the current year may, however, be mitigated by an increase of yardage due to less onerous ground conditions. Recent improvements in tin prices would also be a favourable factor.

During the past financial year Renong earned total revenue of £593,886 as compared with £534,394 previously. Mining costs were £224,179 (£137,515). Dividends absorbed £67,515 (£45,376) and the balance carried forward rose to £32,870 from £26,495.

Meeting, London, December 12.

Lobitos' Offers Become Unconditional

It has been announced that offers made by Lobitos Oilfields dated October 14 and November 4 for the issued capital of Anglo-Ecuadorian Oilfields have become unconditional. As a result of these transactions, holdings of Lobitos and those of South American Gold and Platinum Co. will represent approximately 66 per cent of Anglo-Ecuadorian's capital.

Company Shorts appear on page 630

WIGAN AND DISTRICT MINING AND TECHNICAL COLLEGE

Applications are invited for the post of Head of the Mining and Geology Department, shortly becoming vacant through the retirement of Mr. Robert M. Chalmers, M.C., B.Sc., M.I.Min.E. Duties will commence on a date to be arranged.

Candidates should possess high academic qualifications, preferably an Honours Degree in Mining; practical mining experience; and teaching experience, preferably in a Technical College or University.

Salary in accordance with Burnham scale for Heads of Departments Grade IV (£1,365 - £25 - £1,515). A salary above the minimum of the scale may be paid to a suitably qualified candidate.

Further particulars and application form will be sent by the undersigned. Last date for receipt of applications: Monday, December 19, 1955.

E. C. SMITH,
Principal.

November 22, 1955.

JOHANNESBURG CONSOLIDATED INVESTMENT COMPANY LIMITED

(Incorporated in the Union of South Africa)

EXTRACT FROM THE SPEECH BY MR. H. J. JOEL AT THE ANNUAL GENERAL MEETING HELD AT JOHANNESBURG ON NOVEMBER 22, 1955

It gives me great pleasure to be with you again this year and to submit for your consideration and approval the Directors' Report and the Accounts for the year ended June 30, 1955, which have been in your hands for some time.

As in previous years we have endeavoured in the Directors' Report to cover the more important features of the present position and prospects of your Company, but the following supplementary remarks may be of assistance to your understanding of the Company's affairs.

The main item on the Assets side of the Balance Sheet, namely Investments, shows a reduction in book value as compared with the previous year of £3,299,000. This figure represents the difference between the net amount invested during the year, £1,639,000, and the net amount arising from the adjustment of the book value of Investments, £4,938,000, which is shown as a charge against Investment Reserve on the other side of the Balance Sheet. The main item in the net addition of £1,639,000 to the investment portfolio was the subscription of our due proportion of the new issue made by Freddies Consolidated Mines, Limited, subsequent to June, 1954, as mentioned in the Chairman's Speech last year. Against this increase in amount invested, the book value of Loans has declined by £645,000 from £1,028,000 to £383,000 as a result of repayments, so that the net increase in Investments and Loans, before any adjustment of the book value thereof, was £994,000.

Despite this increase in the amount invested or on loan, it will be seen that the net liquid assets, after providing for all taxation, have increased over the year by £2,204,000, i.e. from £858,000 to £3,062,000. This increase in the net liquid assets is due mainly to the reduction in taxation liabilities as explained in the Directors' Report. The decision of your Directors to adopt an altered basis of valuation of Investments for taxation purposes, on which the aforementioned reduction in taxation liabilities depends, was of recent date, which accounts for the fact that such a large amount of liquid funds remained uninvested at June 30, 1955.

With regard to the amount of £4,938,000 transferred from Investment Reserve and applied in reduction of the book value of Investments, the greater part of this adjustment relates to our holding in Freddies Consolidated Mines, Limited, which, as stated in the Directors' Report, amounted to 7,479,528 shares at June 30, 1955, and has not materially altered since that date. Our large investment in its present form arises from the support given to the Freddies Consolidated Company at the time of the amalgamation of Freddies North Lease Area, Limited, and Freddies South Lease Area, Limited. The hopes for the future which were then entertained were based on a reasonable estimate of the potentialities of the Mines and it will, I think, be agreed that we were justified in continuing to support the Company to the extent involved by that scheme of amalgamation.

Turning to the Profit and Loss Account, income from Investments shows a satisfactory increase of £187,000. Profit on realization of Investments has, on the other hand, declined by £364,000.

Apart from the advantage of non-liability to United Kingdom taxation in respect of the profits for the year under review, it has been possible to transfer to the credit of Profit and Loss Account the sum of £1,800,000 from the taxation provisions made in previous years. This arises partly from the Income Tax relief for a past year which I have just mentioned and partly from the effect of revaluation of Investments on the taxable profits of a number of years. This amount, together with the profit for the year and the balance brought forward from the previous year, has enabled us to transfer the sum of £3,470,000 to Investment Reserve in order to make up the amount of £4,938,000 required for the adjustment of the book value of Investments, as already explained, and to provide for the dividend of 3/- per share less United Kingdom Income Tax, leaving a balance of £115,686 to be carried forward to next year.

GOLD MINING

References have been made at previous Annual Meetings of this Company to the effects upon marginal ore of increasing working costs, and there is, I think, little need to emphasize again the extent to which such ore is thus rendered unpayable and unworkable. The J.C.I. Group has for many years been associated with the operation of low grade mines which have been particularly vulnerable to rising costs. It is of interest to note that in 1950 five mines of the Group were in production and milled 9,116,000 tons at an average recovery grade of 2.502 pennyweights and at an average cost of 27/3d. per ton. During the year ended June, 1955, four mines were in operation and milled 7,529,000 tons. These four mines include Randfontein Estates Gold Mining Company, Witwatersrand, Limited, and The East Champ d'Or Gold Mining Company, Limited, where the production of Uranium is the principal source of revenue, and there remained only one company in which gold mining as such was carried out on a profitable basis, namely Government Gold Mining Areas. This mine milled 3,082,000 tons at a recovery grade of 2.565 pennyweights and at an average cost of 30/9d. per ton. The gold produced during the twelve months ended June, 1955, by mines associated with this Group amounted to 972,954 ounces, which was approximately 7.0% of the total gold produced by the Industry during that period. The contribution to the wealth of the country is, however, under constant threat from the continuing inflation of costs.

It is, of course, inevitable that mines must in due course become worked out and that the prosperity engendered by local mining operations should move from one geographical area to another. The satisfying achievements of the industry as a whole should not mask the fact that there is a continuous process of erosion of gold-mining activities at the lower end of the scale of profitability. It is indeed fortunate for the Industry and South Africa as a whole that new mining areas have come to the fore, while the advent of uranium production has enabled certain mines, such as Randfontein Estates and The East Champ d'Or Company which would otherwise have been on the verge of closure, to continue operating profitably.

The decline in the scale of operations of mines of this Group was foreseen, and in 1943 we commenced prospecting in the Orange Free State with the object of seeking out fresh mining ventures. This prospecting yielded results which in 1947 led to the formation, under the auspices of Johannesburg Consolidated Investment Company Limited, of two mining companies, namely Freddies North and Freddies South. This step was taken with the same confidence as that which inspired the launching of similar ventures in the Orange Free State, ventures which I am happy to say have met with a most pleasing measure of success. In the case of the mining areas of our two companies, however, geological conditions have so far defeated all the strenuous efforts made over the past eight years to bring those companies, and later the amalgamated company, to a profit-earning stage. The future of the company depends largely on an ability to increase revenue and this in turn depends on an improvement in the rate of milling or in the value of the ore milled, or both. The report of Freddies Consolidated Mines, Limited, for the quarter ended September 30, 1955, emphasized the continuing difficulties encountered in endeavouring to increase the rate of production, but development is being vigorously carried out in an attempt to achieve this and also to obtain information about the areas of the mine outside those already exploited.

PROSPECTING

Drilling is being carried out on the farms Modderfontein No. 4, Waterpan No. 45 and Jachtfontein No. 99 and the results obtained warrant the continuance of such operations. Shareholders are naturally anxious that they should be informed as soon as possible of the potential value of this venture, and may be of the opinion that the results of drilling should be published as they are obtained in individual boreholes. As stated in the Directors' Report, the assessment of the potentialities of the area presents a complicated geological problem by virtue of the number of reef horizons involved and such assessment must await the results of further drilling. It is not considered that the interests of shareholders are best served by providing information which must for the present be regarded as incomplete and inconclusive, and which might therefore lead shareholders to form opinions which, in the light of further drilling results, may prove to be erroneous. The work necessary to assess the value of the area is being vigorously pursued.

PLATINUM

The demand for platinum is very strong and the price of the metal has increased both in the United Kingdom and U.S.A. The whole of the output from the Rustenburg Platinum Mines is at present being sold.

The Chairman concluded by reviewing the other widespread interests of the Group.

HARMONY GOLD MINING COMPANY LIMITED

At the Fifth Annual Meeting of shareholders held in Johannesburg, on November 14, 1955, **Mr. P. H. Anderson,** the Chairman, in the course of his remarks said:—

Good progress has continued to be made at the property and your mine is now equipped to operate on the basis of a nominal milling capacity of 90,000 tons per month—the second 45,000 ton unit of the gold plant having been commissioned during the last month of the financial year under review. The monthly rate of milling is steadily being built up and reached 73,000 tons in October. The 80,000 ton uranium plant which was commissioned in April this year is being operated to full capacity by treating accumulated slimes from the dam in addition to current tailings from the gold plant.

An initial available ore reserve at June 30, 1955, was declared at 931,000 tons with a value of 8.0 dwt. over a stoping width of 57.9 in. equivalent to 463 in. dwt.

FAVOURABLE MINING CONDITIONS

The favourable mining conditions encountered to date at the Harmony mine have permitted the use of widely spaced reef drives and raises and the adoption of a longwall system of stoping and the development of replacement reserves for the immediate future will be derived very largely from stoping operations. It is intended gradually to step up the rate of reef development as soon as possible after production has caught up with the present milling capacity, in order to ensure the provision of adequate stope faces to meet the requirements of any expansion planned for the future.

Now that the first stage in the opening up and exploitation of the Harmony mine is virtually complete it has been decided to proceed with the sinking of the second main hoisting shaft, No. 2 Shaft, some 5,500 feet north-north-west of No. 3 Shaft. The Shaft has been excavated to a depth of 66 feet and the foundations for the permanent headgear and permanent winding equipment are under construction. Sinking with this permanent equipment is expected to commence in about eight months' time and the 26 foot diameter circular shaft, which is to be sunk to a depth of about 6,000 feet, should be ready for hoisting in from two or three years depending on sinking conditions. The mine will then have a hoisting capacity of about 200,000 tons per month. Meanwhile, twin footwall haulages are being driven northwards from No. 3 Shaft and are expected to reach the site of No. 2 Shaft before the middle of 1956. This will considerably extend the base from which mining operations can be carried out, and the short boreholes being drilled at 65 foot intervals from the haulages up to the Basal Reef will give a useful indication of the values between the two shafts, pending the undertaking of actual reef development in this area.

Since my last report the reef body has, broadly speaking, continued to show no disturbance from faults and dykes of any practical significance; comparatively little water has been encountered and the quantity pumped to surface is still less than 300,000 gallons per 24 hours; negligible quantities of methane gas have been detected and in view of the provision of adequate ventilation facilities the Government Mining Engineer has relaxed considerably the fiery mine regulations.

Shortly after stoping operations got under way it became apparent that the hanging wall, as in most of the rest of the Free State Goldfield, lacked the cohesion of that on the Rand in that these quartzites are laminated with distinct bedding planes. Due to this lack of cohesion, shearing of the hanging wall at the stope faces is inclined to occur despite close mat pack and waste support. Although the problem of controlling the hanging wall under these conditions is not regarded as serious, the generally weak nature of the hanging and the relatively wide stoping widths will entail the use of fairly costly methods of support. Fortunately the position is not at present complicated by the presence of khaki shale.

Development results during the past year have shown that in the Ventilation Shaft area values have tended to fall off a little both in regard to percentage payability and inch-dwt. This was due in small part to the occurrence of a few isolated erosion channels, of which I made mention last year, but in the main to a general downward fluctuation; latterly, however, there has been some improvement to the north. In No. 3 Shaft area the promise held out by the high values intersected in the shaft reef and ore passes was fulfilled, and values in this area were very much better than had been anticipated on the indications given by the reef intersections in H.2 borehole and in the shaft. This deterioration in the one area and improvement in the other were to some extent compensatory, and the major factor contributing to the falling off in the overall development results during the past year was an abnormality in reef deposition encountered in the area between the Ventilation Shaft and No. 3 Shaft. It seems likely that the Basal Reef was originally deposited under shallow-water conditions and that in this area there was a sandbank or group of sandbanks which precluded the deposition of the bottom portion of the reef; consequently less gold was deposited, the reef is narrower and the footwall contact appears to be raised up towards the hanging—hence the adoption of the descriptive nomenclature for this localised occurrence "elevated footwall". This elevated footwall condition persisted on and off between 6 and 13 Levels in the east-west winze-raise connection between the two shafts, and in order to establish its extent on the strike of the reef, 10 Level drive is being advanced north and south. Stoping operations in this area commenced in May of this year, and two longwall stope faces of 1,000 feet each are being advanced north and south off the winze-raise connection in this elevated footwall area.

In the area between Nos. 3 and 2 Shafts the reef is being initially prospected, as I have already mentioned, by means of boreholes drilled at close intervals from the twin haulages which are being advanced northwards from No. 3 Shaft. The first four boreholes drilled averaged 599 inch-dwt., and conformed fairly closely with the general run of values around No. 3 Shaft, but thereafter results have been erratic in that in three holes the Basal Reef has not been fully developed—possibly due to local erosion channels or elevated footwall conditions; minor faulting with loss of reef occurred in another, and in two others there was loss of core due to grinding. Of the 21 boreholes drilled so far, the inclusive overall average has been 12.4 dwt. over a channel width of 28 inches, equal to 347 inch-dwt. It is confidently expected, however, that this borehole programme will yield improved results as the haulages advance towards No. 2 Shaft.

In so far as the Company's finances are concerned, the funds required for the present capital programme, which is mainly in connection with the sinking of No. 2 Shaft, have been provided from profits and from temporary loan facilities of up to £1,000,000 which expire on the 31st December, 1955. I am pleased to be able to report that your Board accepted on Friday last, the 11th November, an offer by The Central Mining & Investment Corporation Ltd. and Rand Mines, Ltd., to subscribe jointly for 450,000 reserve shares at 28s. 9d. per share (being the closing market price on the previous day), thereby extinguishing the existing temporary loan arrangements made available by them. These two companies have also undertaken to grant new temporary loan facilities of up to £250,000 at 6 per cent. repayable by December 31, 1956. It is hoped that any increase over the present capacity of 90,000 tons per month can be financed out of profits.

CHAIRMAN'S REPLIES TO QUESTIONS

A shareholder drew attention to the fact that uranium profits are published "subject to adjustment". He asked how these adjustments came about and whether they affected the grade, the quantity or the price of uranium. The Chairman pointed out that he was precluded owing to the provisions of secrecy imposed by the Atomic Energy Act from answering this question in detail. He did, however, point out that the reason for making the qualification "subject to adjustment" was that payments for uranium are based on a sliding scale formula depending on various factors which are not exactly determinable at the time the provisional payments are made and which necessitate periodical adjustments; as these adjustments were not likely to be very material it was considered preferable to make early announcements of the profit "subject to adjustment".

In reply to another question, the Chairman stated that it was intended to crosscut to the Basal Reef from the 17 level twin haulages before these reached No. 2 Shaft and to do some reef development in this area between the two shafts in the near future.

In reply to a further question, the Chairman stated that the pyrite flotation plant which was being erected at the Company's mine property was primarily for the purpose of ensuring that pyrite would be available for use in the uranium industry and that it was expected that only a nominal profit would be obtained from the operation of the plant as such.

The two special resolutions, dispensing with the necessity for the Company to comply with the provisions of Sub-section 9 of Section 70 quin of the Companies Act, as amended, and amending the Company's Articles of Association in certain respects to enable it to issue Bearer Share Warrants should it desire to do so at any time were passed unanimously.

The Report and Accounts were adopted.

BLYVOORUITZICHT GOLD MINING COMPANY LIMITED

At the Eighteenth Annual Meeting of shareholders held in Johannesburg on November 15, 1955, **Mr. W. M. Frame,** the Chairman, in the course of his remarks said :—

While there was an improvement in the supply of non-European labour the shortage of European personnel continued and although, by making the best use of the available labour force, it was possible to show a marked increase in the footage developed, the tonnage milled was only slightly higher.

During the first four months of the current financial year the seasonal decline in the non-European labour strength has been more marked than it was in the same period last year. The power position has improved to an extent that has permitted the mine to revert to the 6 day milling week as from September.

The payable ore developed at 1,262,700 tons was greater by 386,700 tons than that for the previous year but the average value was lower by 0.6 dwt. per ton.

The development footage advanced on reef showed a noticeable increase during the year and the average value of payable disclosures improved appreciably compared with the previous year. This was due mainly to there having been more reef development in the eastern portion of the mine than had been accomplished in the previous financial year. Exploratory development in the western portion of the mine is continuing but the values disclosed continue lower than the average for the mine.

IMPROVED WORKING PROFIT

The benefits derived from the increased tonnage milled were more than offset by a slightly lower average yield and these factors, combined with higher working costs, caused the working profit from gold mining to fall by nearly £64,000 to £5,564,400 for the year under review. On the other hand, the working profit from uranium extraction—subject to adjustment—rose by £351,000 to £1,104,800. The total working profit of £6,669,300 therefore compares favourably with that for the previous year, being approximately £287,000 greater.

The presence of underground water fissures continued to be a serious factor in mining operations, particularly in A1 and A3 Sub-Incline Shafts where sinking progress was also retarded by the work involved in cutting and equipping of pump and engine chambers. A little over 7¼ million gallons of water a day were pumped to the surface during the year under review, an increase of 820,000 gallons per day compared with the previous year. Pumping capacity was increased and, allowing for maintenance work on the equipment, the present facilities are capable of pumping approximately 15 million gallons of water a day.

Satisfactory progress has been made in advancing the twin haulages on 6 Level from No. 1 Shaft towards the position of the Sub-Vertical Shaft. Preparatory work in connection with the sinking of this shaft may commence early in 1956.

The uranium plant operated satisfactorily and at full capacity throughout the year. A further sum of £48,240 was expended during the year bringing the total to £3,924,149, inclusive of interest on the loans, and it is estimated that a further £141,500 remains to be spent on this project. At June 30 the amount outstanding, together with accrued interest, on uranium loan account was £3,587,559, which is being repaid at the rate of £124,691 per quarter until the end of the year 1963.

In my address to shareholders last year I mentioned the possibility of a plant being erected on the company's property for the production of sulphuric acid for use in the uranium industry. It was then estimated that the capital cost of this project would be about £430,000. That estimate was based on the assumption that the company would erect a sulphur-burning plant which would have relied entirely on imported raw material. On further consideration of the matter our technical advisers recommended the erection of a pyrite-burning plant which can use locally produced raw material and whose operating cost will be lower than that of a sulphur-burning plant. The capital cost of the revised project is now estimated at about £750,000. Arrangements have recently been concluded with the Atomic Energy Board in terms of which the company will erect a pyrite-burning plant for the production of sulphuric acid, and the capital cost of the project will be provided by means of loan facilities being arranged through the same authority. It is considered that satisfactory profits will accrue to the company from the operation of this plant after providing for the amortization of the capital cost and interest.

The special resolution dispensing with the necessity for the Company to comply with the provisions of sub-section (9) of Section 70 quin of the Companies Act, as amended was passed unanimously.

The Report and Accounts were adopted.

CONSOLIDATED MAIN REEF MINES AND ESTATE, LIMITED

MR. T. REEKIE'S ADDRESS

At the Fifty-seventh Annual Meeting of shareholders held in Johannesburg on November 15, 1955, **Mr. T. Reekie,** the Chairman, in the course of his remarks said :—

The results at the mine were again rather better than might have been anticipated, mainly due to the higher yield and an improvement in the non-European labour supply which enabled the tonnage milled to be increased. The benefit of this was, however, largely offset by the continued rise in costs. Moreover, as has been pointed out in the Directors' Report, the problem of maintaining both grade and tonnage is becoming increasingly difficult. Owing to the declining number and increasingly scattered nature of the available reserve blocks which are distributed over five reef horizons the rate of mining from these reserves, and consequently the tonnage to the mill, must soon decrease. During this financial year, however, it might be possible, if the labour supply is adequate, to keep up the mill tonnage, but the yield is likely to be lower because of the preponderance of low grade ore available for mining. You will already have seen some evidence of a decline in yield in the published results for the first four months of the year and it is necessary for me to point out that it may not be possible to maintain the present level of monthly profits for the remainder of the year, and that thereafter, as may be deduced from the information which has been given to you, the trend of profits will be downward.

Although it was gratifying that the tonnage of ore developed last year showed a substantial increase and that there was a decrease of only 72,000 tons in the available ore reserves, here again I must mention that, as the areas suitable for development are limited, this position is unlikely to be maintained and that a more rapid rate of decline in the reserves is to be anticipated in the future.

CHAIRMAN'S REPLIES TO QUESTIONS

The Chairman read a letter which had been received from an overseas shareholder asking for a reply at the meeting of two questions raised in the letter.

In reply to the first question, as to why large parts of claims on the South, Bird and Kimberley Reefs had not been developed, the Chairman stated that the areas were almost certainly unpayable. In nearly every case, each such part was surrounded by unpayable reef and despite an appreciable amount of internal development in recent years, little additional payable ore had been exposed. The southernmost exploration on these reefs had revealed a steady decline in payability and value and all evidence indicates that the large intact areas are completely unpayable.

In reply to a further question regarding the possibility of extending operations on the Main Reef and Main Reef Leader beyond the Company's southern boundary, the Chairman stated that because of the large potential tonnages involved this matter had for many years been given most careful consideration. Despite the generally discouraging values above 60 level three costly winzes—62E1, 60E1 and 60W2—had been sunk from the lowest workings on these reefs towards the southern boundary; driving and raising had been undertaken and also some borehole drilling. Unfortunately this work had indicated payability of the order of 10%, which would render mining operations in that area unprofitable.

The special resolution dispensing with the necessity for the Company to comply with the provisions of sub-section (9) of Section 70 quin of the Companies Act, as amended, was passed unanimously.

The Report and Accounts were adopted.

CONVERSION OF HARMONY'S 6 PER CENT NOTES

A recent circular from Harmony Gold Mining Co. reminded shareholders that their right to convert holdings of 6 per cent Registered Unsecured Convertible Notes into shares of the company could be exercised up to December 31, 1955.

Interest on the principal monies represented by the Notes, surrendered for conversion at any time during December, will accrue in full up to and including December 31. Conversion application forms have accordingly been sent to noteholders and these should be completed and sent, together with the Notes, to reach the office of the London Secretaries at 4 London Wall Buildings, on or before December 31, 1955.

It is, therefore, suggested that if conversion is desired shareholders should not wait until the end of December before submitting their Notes but should do so at their earliest convenience during that month. This will greatly assist in easing the burden on the London Secretaries.

RHODESIAN ANGLO AMERICAN LIMITED

(Incorporated in Northern Rhodesia)

CONTRIBUTION OF PRIVATE ENTERPRISE TO FEDERAL DEVELOPMENT

SIR ERNEST OPPENHEIMER ON EXPANDING INTERESTS

The 26th annual general meeting of members will be held in Nkana, Northern Rhodesia, on Wednesday, December 14, 1955. The following is an extract from the statement by the chairman, **Sir Ernest Oppenheimer**, which has been circulated to stockholders with the annual report and accounts for the year ended June 30, 1955 :—

It has not previously been my custom as Chairman to issue a Statement, as a full summary of the operations of the copper mining companies is contained in the annual report.

While the shares in these companies continue to be our main investment, we have, particularly since the federation of Rhodesia and Nyasaland, expanded our interests and as we intend playing an increasingly active part in the development of the Federation, I believe that stockholders will now welcome an annual statement.

I do not think that many stockholders appreciate the wide extent to which private enterprise has contributed to the general development of the Rhodesias. The copper mining companies operating in Northern Rhodesia had to establish their own towns with communal and domestic amenities. They had to provide their own water schemes and their own power stations and many other essential services which, in a developed country, would have been the obligation of the Government or Local Authorities.

HEAVY CAPITAL EXPENDITURE

The mining companies and their ancillary units, for which we and our parent company, Anglo American Corporation of South Africa Limited, are responsible in Northern Rhodesia, not only found the capital funds of over £35,000,000 required to open up the mines and to provide the necessary services, but have since then retained about £45,000,000 from profits for the expansion of the industry and the development of services and amenities for their employees.

Our copper mining companies and those of the Rhodesian Selection Trust Group formed the Rhodesia Congo Border Power Corporation Limited to take over the distribution of electric power on the Copperbelt. The total cost of the installations required to provide power is to date £16,000,000 and more has to be expended to complete the work in hand.

The Rhodesia Broken Hill Development Company has spent £1,300,000 on its Mulungushi and Lunsemfwa hydro-electric schemes and now, in conjunction with the Northern Rhodesian Government and the Broken Hill Municipality, has embarked on an extension of the hydro-electric power project on the Lunsemfwa River at an estimated cost of £1,000,000. This will, it is hoped, provide the power required at Broken Hill until power from Kariba becomes available to meet future requirements.

In Southern Rhodesia, the Wankie Colliery Company, on which the copper mines in Northern Rhodesia, the tobacco and other industries in Southern Rhodesia, and the railways and power stations are dependent for their coal supplies, has been committed to capital expenditure exceeding £6,000,000. The company now has a productive capacity of some 4,500,000 tons of coal per annum and is expected to be able to produce at the rate of 5,000,000 tons early in 1956.

The copper mining companies have with the mines of the Rhodesian Selection Trust Group established The Copperbelt Technical Foundation with the object of operating a series of technical institutions in the leading towns at an initial cost of £400,000.

KARIBA HYDRO-ELECTRIC SCHEME

The decision of the Federal Government to proceed with the Kariba Hydro-Electric Power Scheme on the Zambesi River is very important not only for the mining industry but for all consumers of power in the country. The project will provide the power requirements of the Federation for many years to come and cheap power will attract new industrial development and assist existing enterprises. The expansion will, however, create a great strain on communications within the country, and it is of the utmost importance that the Rhodesia Railways should be equipped immediately to overcome the present shortage of rolling stock and staff in order to meet the increased traffic as it eventuates.

We have indicated our willingness to assist in providing some of the funds required for the Kariba project and we are willing to help in the expansion of communications and other public works not only as an essential protection for our mining companies, but as a long-term investment in the country.

To this end we, jointly with Anglo American Corporation of South Africa Limited, formed Anglo American Rhodesian Development Corporation Limited in June, 1955. This Development Corporation has already raised a 15-year sterling loan of £2,500,000 in Holland, and has taken over the loan of £1,000,000 made by us to the Rhodesia Railways in 1954. It has recently undertaken to provide, in the next two years, £5,000,000 of rolling stock, including bogies and tank cars, which the Rhodesia Railways will hire from the corporation.

Geological prospecting in the Federation has been accelerated. Through our investment in Anglo American Rhodesian Mineral Exploration Limited, which is operating in Southern Rhodesia and Nyasaland, and in Chartered Exploration Limited, which will conduct an intensive search for minerals over a very large part of Northern Rhodesia, we will participate in any discoveries made by these companies.

AFRICAN ADVANCEMENT

Members will recall the disappointments and setbacks that characterized almost all negotiations on this complex subject for many years. However, with patience and good will prevailing, an agreement was signed on July 30, 1955, between the copper mining companies for which we are responsible and The Northern Rhodesia Mine Workers' Union whereby a measure of advancement for African workers on our mines was agreed upon. It was also agreed that further measures of advancement would be considered by both parties later.

This agreement was followed by similar agreements concluded by the mining companies of the Rhodesian Selection Trust Group and, finally, by one between the Northern Rhodesia Chamber of Mines and the Mine Workers' Union embracing the copper mining industry as a whole.

Thus, another important chapter in industrial relations in this part of the world has been brought to a successful conclusion. There seems every hope that a permanent solution will be found which will be fair, just and acceptable to all concerned.

The progress in the two years since the Federation of Rhodesia and Nyasaland came into being in September, 1953, has strengthened the confidence we have always had in the territories which now form this new State. The benefits that we expected to flow from the integration of the complementary economies of Southern Rhodesia, Northern Rhodesia and Nyasaland are emerging, and the hopes that we held for the future of the Federation are being realized.

The Federation offers many opportunities for mining, industrial, commercial and agricultural development. It offers to men and women the opportunities of a new country with a young and healthy approach to its problems. It requires much in the way of capital and technical skills, and, in those fields which are within our capacity, we will continue to play our full part.

Copies of the annual report and accounts may be obtained from the transfer offices at Kitwe; 44 Main Street, Johannesburg; and 11 Old Jewry, London, E.C.2.

RECENT INTERIM DIVIDEND ANNOUNCEMENTS

Company	*Year Ending*	*Dividends* %	*Date payable*	*This Year to date* %	*Total last Year* %
H. E. Proprietary	31.12.55	5	Nov. 30	5	15
Tongkah Tin *a*	30. 6.55	20	Dec. 7	35	20
S. Kinta *b*	31. 3.56	12½	Dec. 14	12½	82½
Taiping Cons.	31.12.55	15	Dec. 3	15	40
Gopeng Cons. *c*	30. 9.55	10	Dec. 20	30	25
Rambutan *d*	30. 6.55	10	Nov. 30	35	11¼
,, *e*	30. 6.56	10	Nov. 30	10	35
Amalgamated Tin	31. 3.56	8	Dec. 30	8	45
Siamese Tin Synd.	31.12.55	17½	Dec. 10	25	30
Kuala Kampar	31. 3.56	15	Dec. 21	15	90

a Less 30% Malayan tax (no further divs. to be paid for year).
b Current dividend paid on reduced capital.
c Fourth interim (previous year five interims of 5 per cent).
d Fourth interim.
e First interim.

RHOKANA CORPORATION LIMITED

(Incorporated in Northern Rhodesia)

RECORD NET PROFIT EXCEEDS £10,000,000

SIR ERNEST OPPENHEIMER ON AFRICAN ADVANCEMENT

The following is an extract from the review by the chairman, **Sir Ernest Oppenheimer,** which has been circulated to stockholders with the annual report and accounts for the year ended June 30, 1955 :—

The total net profit for the past year, at £10,020,000, constitutes a record for the Company, and is £540,000 in excess of the profit for the previous financial year on a comparable basis. This is a gratifying result, more particularly as production during the year was adversely affected by the strike of African employees during the first quarter of 1955. The fact that the profit of £6,190,000 arising from the Company's mining operations was only £100,000 less than last year is due, to a considerable extent, to the improvement in the price of copper and to our ability to maintain limited production during the strike period.

A small reduction of profit accruing from our mining operations was more than offset by an increase of £640,000 in our investment income, the dividends received from both Nchanga Consolidated Copper Mines Limited and Mufulira Copper Mines Limited being higher than in any previous year.

The Company's other major investment is in Bancroft Mines Limited. In January of this year the Board of that Company announced its decision to develop and equip the mine for an eventual production rate of 85,600 long tons of copper per annum, which is exactly double the tonnage originally contemplated. It is expected that the mine will come into production in 1957 and that the output will gradually be stepped up to 85,600 tons by 1960.

RESPONSIBILITY AND INTEGRITY—KEYNOTE OF AFRICAN ADVANCEMENT

The developments which have taken place recently in regard to African advancement are all the more satisfying to me in that they were achieved so soon after the strike of African employees, which was regrettable not only in its effect upon the Company, but in that it revealed that the African Trade Union leaders had not yet appreciated to the full the measure of responsibility that is placed upon them by virtue of their office. The key-note to African advancement is responsibility and integrity and, now that the first steps have been taken, the African Mineworkers' Union must prove that they are worthy of the responsibility placed upon them. They must show that they have the ability and willingness to consolidate what has been made possible by the co-operation with the Companies of the European employees, and must take full advantage of the training schemes which are available to them.

I wish to take this opportunity to pay a tribute to both the European employee organizations—The Northern Rhodesia Mine Workers' Union and The Northern Rhodesia Mine Officials and Salaried Staff Association—for their considerable foresight in this matter. Those of the employees represented by the Salaried Staff Association are not affected immediately by the agreement to transfer a specified number of jobs from Europeans to Africans, but their readiness to entertain the principles thereby established should be given full recognition. The European Union's decision to co-operate with the Companies in the matter of African advancement is an important event and I regard the lengthy period of negotiations as time well spent, as the considerations were carefully weighed before this important decision was taken. The question of African advancement is of vital importance. Good employee relationship is fundamental to the industry's future, and its attainment implies continuing and wholehearted collaboration between the employees and the Companies in the approach to a problem which has to be faced but which allows of no easy nor rapid solution.

The coal stocks which were accumulated during the strike have enabled the Company to make up any shortfalls in coal supplies during the winter but, when this review was prepared, these stocks were still diminishing, and unless the Rhodesian Railways can transport, during the summer months, more than the normal monthly requirements of the copper mines so that the stock can be replenished, operations will be seriously handicapped. Although we had hoped to discontinue wood-burning it is now probable that this will have to be continued for some time to come. The position may be eased when power supplies from the Belgian Congo come through in 1956, but the improvement can only be temporary, as the Copperbelt's power requirements will continue to increase. Urgent steps must be taken to increase the carrying capacity of the railways.

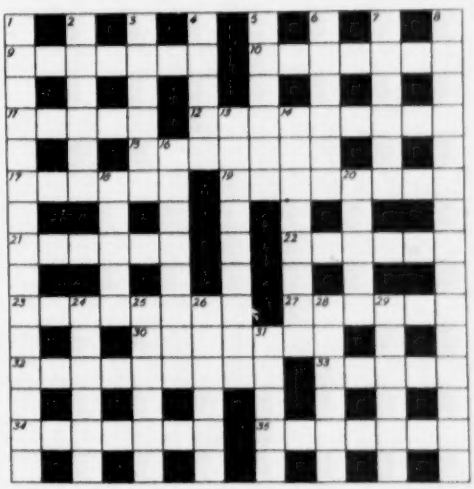
I therefore welcome the formation by Anglo American Corporation of South Africa Limited and Rhodesian Anglo American Limited of Anglo American Rhodesian Development Corporation Limited, which Company has recently undertaken to assist the railways by purchasing £5,000,000 of trucks which the railways will hire. It is also essential that power should be available from the Kariba project as soon as possible and we shall endeavour to play our part in assisting to finance this great project.

CONFIDENCE IN FIRM DEMAND FOR COPPER

It can be accepted that the substantial increase in the price of copper between June, 1954, and September, 1955, amounting to nearly £150 per ton was, to a considerable degree, the direct consequence of strikes on the mines in Chile, the United States, and in Northern Rhodesia, and the recent recession from the peak of just over £400 per ton was therefore to be expected. I am confident that a firm demand for copper will continue in the future and that an increased world production can readily be absorbed. It must, of course, be expected that we should have to face competition from substitutes, especially aluminium, but this competition is intensified by the overall shortage of copper. It is satisfactory that additional tonnages of copper will shortly be available from the Bancroft and Chibuluma Mines.

I remain completely confident that the copper mining industry will continue to play a major part in promoting the development and well-being of the Federation of Rhodesia and Nyasaland.

Copies of the annual report and accounts may be obtained from the Head Office, Kitwe, or from the transfer offices at 44 Main Street, Johannesburg, and 11 Old Jewry, London, E.C.2.



'UNICONE' CROSSWORD No. 12

ACROSS.—9. Perform, in the theatre perhaps (7). 10. Stop the chorus (7). 11. Run back and get the direction (5). 12. Fifth column work (9). 15. "Like — Hesper" (Spenser Prothalamion) (7). 17. The Arab's at home if you get my meaning (6). 19. It's needy in Northumberland (8). 21. Buzz round the priest (6). 22. Convincing little chap is after the little company (6). 23. A ship steers wildly around (8). 27. There's a great number of people in the race (6). 30. Go between (7). 32. It should be easy to figure this out (9). 33. All that remains (5). 34. Useful for climbers (7). 35. Court charges (7).

DOWN.—1. But it sounds just as good on a dark night (9, 6). 2. He works best when in a hole (6). 3. "Happy field or mossy —" (Keats) (6). 4. Thus do heroes get fed-up (5). 5. Send cash with order (6). 6. Such a person is distinguished (2, 4). 7. Alas I'm eaten (6). 8. Keep this under observation. It may be necessary to 9 across (11, 4). 13. They let parents out (7, 2). 14. Pure and simple (8). 16. It has nothing to do with nuclear fission (8). 18. To strike out but it sounds as if someone was not truthful (5). 20. A sound of grief before tea (5). 24. A very little while in the red (6). 25. Some say S.M.'s are (6). 26. Something to eat (6). 28. Adornment of many a chimney-stack (6). 29. Initially lacking is the land of a thousand lakes. (6). 31. Open mouthed and expectant (5).

Solution on page 630

With the compliments of

THE 'UNICONE' CO. LTD., RUTHERGLEN, GLASGOW, SCOTLAND
MAKERS OF UNICONE FLEXIBLE JOINTS FOR ALL PIPELINES

ROAN ANTELOPE COPPER MINES LIMITED

(Incorporated in Northern Rhodesia)

The following is an extract from the statement dated October 18, 1955, by the Chairman (**Mr. Ronald L. Prain, O.B.E.**) circulated to the Members:

RESULTS FOR THE YEAR

Blister copper production for the year was 82,696 tons.

The average cost of production of both blister and electrolytic copper increased from £126 1s. 0d. to £142 0s. 3d. per ton. The average realization price of both types of copper for the year was £270 11s. 8d. per ton. The difference between this figure and the cost figure mentioned above resulted in a profit of £9,859,418. The increase in the value of copper stocks brings this profit up to £10,626,303, and taxes are estimated to be £3,896,000.

The appropriation to Replacements Reserve is £1,000,000 and to General Reserve £1,400,000.

There remains £4,565,452 available for distribution after bringing in £93,428 from the preceding year. Last July an interim dividend of 1s 3d. per share, less taxes, was paid: a final distribution of 2s. 9d., less taxes, is now recommended, making a total distribution of 4s. per share for the year, costing £4,494,000.

AFRICAN ADVANCEMENT

The Rhodesian Copperbelt contains about one quarter of the published copper ore reserves of the world, expressed in terms of recoverable copper, and is destined to become perhaps the most important copper producing area in the world within the measurable future. Few young countries are endowed with such a heritage. We take the view, however, that this heritage is only good if on the one hand we can develop a system of race relations between the European and African employees on these mines which will ensure the peaceful and harmonious operation of this industry in the years to come; and on the other hand if we, together with the rest of the copper industry, can continue to develop profitable markets for copper which will ensure the absorption of existing productions and of the big new productions which will be coming into the world in the next few years.

It is clear, therefore, that those who from time to time over the years are charged with the responsibility for the management of these mines cannot afford to take other than the longest possible view, even if this involves from time to time some sacrifices on the short view.

It was, therefore, with much pleasure that we were able to announce last September that agreement had been reached between the Copperbelt Companies and the European Mine Workers' Union on a scheme which will provide immediately a number of new opportunities for our African employees and create for them the nucleus of an intermediate field of employment. The Agreement provides for a job survey to be undertaken as soon as possible of all the remaining jobs within the European field and provides for negotiations to follow the survey which will, we hope, result in a comprehensive plan which will represent a permanent solution of the advancement problem. The features of this plan, it is expected, will be the completion of the intermediate field for Africans and agreement on a permanent field of employment open to European Union members as at present and also open to suitably qualified and experienced Africans at the same rates of pay and emoluments as those enjoyed by Europeans similarly engaged.

This Agreement was the result of years of negotiation. During the last ten years or so three Boards of Inquiry or Commissions have examined the problem of African advancement on the Copperbelt and increasing interest in this matter has been shown in many parts of the world.

The Agreement that has now been reached reflects great credit on those who were responsible for negotiating it, and I should like to pay my tribute to the European Union for the realism with which they have dealt with this problem. A settlement along the lines envisaged will not only safeguard our European employees against any alleged risk of unfair competition, but will also provide for our African employees that real equality of opportunity which alone can give practical expression in the industrial field to the spirit of partnership on which the Federation is based. Africans will now have the chance, previously denied to them, of proving some of their claims. Difficulties in dealing with as complex a problem as this must inevitably arise from time to time, but given goodwill on all sides there appears to be now no reason why industrial relationships on the Copperbelt should not be placed on a sound and workable basis.

RHODESIAN SELECTION TRUST LTD.

(Incorporated in Northern Rhodesia)

The following is an extract from the statement dated October 18, 1955, by the Chairman (**Mr. Ronald L. Prain, O.B.E.**) circulated to the Members:

I will start by reviewing briefly the position of the Companies in which we are mainly interested, namely, Mufulira, Chibuluma, Baluba and Chambishi.

Our confidence in Mufulira as one of the great copper mines of the world remains unchanged. Our holding in Mufulira is now 63.98 per cent.

CHIBULUMA

When the Chibuluma enterprise was started in 1951 it was planned to start ore hoisting in October, 1955. It reflects great credit on the Manager and his staff and the Consulting Engineers that the mine was in a position to carry out this programme. It is no fault of the organization that certain delays have occurred in the arrival of the main winder and of the steelwork for the concentrator. However, by moving a temporary winder from Mufulira, ore hoisting did actually begin as planned in October, and will continue at an average rate of about 15-18,000 tons a month until the initial stopes have been opened up, when we shall be in a position to hoist the rated capacity of 40,000 tons per month.

The delay in the arrival of the main winder and concentrator steelwork was due partly to the suppliers, and partly to the dock strike in the United Kingdom. The concentrator is expected to be available for operations on or about April 1, 1956. Until then the ore which is now being hoisted will be added to the stockpile on the surface.

These delays will involve an unforseen increase in the expenditure which must be incurred before revenue is received. The extent of this increase has still to be ascertained but it is hoped to avoid any call on shareholders to meet it.

The mill at Chibuluma will produce a copper concentrate and a cobalt concentrate. The copper concentrate will be smelted at one or more of the Copperbelt smelters and the cobalt concentrate will be sent to the Chibuluma cobalt plant which is under construction at Ndola. This plant is expected to come into production about the middle of next year and arrangements are in hand for the treatment in Europe of its first product, which will be a cobalt matte containing about 10 per cent. cobalt.

Our holding in Chibuluma is 64.29 per cent. Our holding in each of the Baluba and Chambishi companies also is 64.29 per cent. Both are potentially large mines for the future and work is proceeding at both properties to increase our knowledge of the extent and characteristics of the orebodies.

COMMITMENTS

I mentioned last year that in view of the increased scope and possibly greater financial commitments which your Company now has by virtue of its more diversified shareholding interests, the Board felt that the cash resources of the Company should be increased. Last year the dividend paid by the Company was somewhat less than its income and as a result the free cash in the Company was increased to about £297,000. This has been partly used up by the purchase of further shares in Mufulira, Chibuluma, Baluba and Chambishi which together cost about £175,000, reducing our free cash to £122,000. There are also continuing commitments on the drilling at Baluba and Chambishi and some other minor calls on our funds. For this reason your Board has again decided to withhold a small proportion of income to build up cash resources further.

FINANCIAL RESULTS

The income for the past year which, apart from a small credit for interest received, came exclusively from Mufulira dividends, amounted to £3,518,000, against which expenses amounted to about £65,000.

In July an interim dividend of 1s. 6d. per share, less taxes, was paid and a final dividend of 3s. 3d. per share, less taxes, is now recommended. The dividend distribution for the year, will, therefore, cost £3,357,000. This will allow the cash position to be built up again as outlined earlier, and the sum of £250,000 has therefore been transferred to General Reserve, representing approximately the free cash in the Company.

STOCK EXCHANGE LISTINGS

Dealings began last July in the Company's shares on the New York Stock Exchange and have attracted considerable interest. During the first eleven weeks of trading the transactions in Rhodesian Selection Trust shares for three of those weeks were the highest of any security listed on the Stock Exchange.

During the year our shares were also introduced unofficially to the Brussels Bourse through the facilities afforded by the Banque Lambert.

MUFULIRA COPPER MINES LIMITED

(Incorporated in Northern Rhodesia)

The following is an extract from the statement dated October 18, 1955, by the Chairman (**Mr. Ronald L. Prain, O.B.E.**) circulated to the Members:

RESULTS FOR THE YEAR

Copper production totalled 83,193 tons made up as to 47,240 tons of blister and 35,953 tons of cathodes.

The average cost of production of all types of copper increased from £114 4s. 5d. to £133 7s. 0d. per ton. The average realization price for the year was £273 19s. 0d. per ton. The difference between this figure and the cost figure mentioned above resulted in a profit of £11,554,261. The increase in the value of copper stocks brings this profit up to £12,069,354; taxes are estimated at £4,420,000.

The appropriation to the Replacements Reserve is £1,500,000 and the transfer to General Reserve is £1,000,000. There remains a sum of £5,552,105 available for distribution after bringing in £121,511 from the preceding year.

Last July an interim dividend of 6s. per share, less taxes, was paid, and a final dividend of 14s. per share, less taxes, is now recommended, making a total distribution of 20s. per share for the year.

MINE POSITION

Ore reserves were increased during the year by 6.7m. tons due to new information from development and drilling between the 1350 ft. and 1600 ft. levels at the western end of the mine and to drilling below the 1,600 ft. level. During the year the Boise shaft came into operation for the first time.

The electrolytic refinery is expected to be completed during the current year. We expect to make our first wirebars some time early in 1956 and thereafter the capacity of this refinery will very nearly match the capacity of the Mufulira enterprise as a whole. In due course we expect to be in a position to produce most commercial shapes of refined copper.

LABOUR POSITION

There are outstanding with the European Union two disputes, the first dealing with leave conditions, on which it has been agreed to go to arbitration, and the second dealing with a demand for a 15 per cent. increase in the basic pay for artisans, which will go to conciliation later in October.

As far as African labour is concerned, since the end of the financial year the Copperbelt companies have introduced a new scale of cash bonus and cost-of-living allowance, the previous allowance being consolidated into basic pay. There remains outstanding a claim by the African Union for an increase of 6s. 8d. per shift for all African employees represented by the Union. This matter has been to conciliation, and will now go to arbitration.

The Chamber of Mines has also offered to the African Union a scheme for re-grouping some employees so that they will now go into a higher group, and therefore enjoy increased remuneration, and furthermore an offer has been made to put all employees on an inclusive wage basis which at present applies only to employees in the higher groups.

Mr. Prain's remarks on the question of African Advancement are identical with those contained in the extract from his Statement to members of Roan Antelope Copper Mines (printed in an adjoining column).

POWER

This time last year we were very concerned at the power position from three aspects, namely, supply of fuel, the provision of transport for fuel, and the question of generating capacity.

During the past 12 months the position has changed considerably. On the long term aspect it is satisfactory that the Federal Government has decided to proceed with the Kariba hydro-electric scheme which is expected to come into operation in 1960. Studies are now being made to see whether the Copperbelt will be able to get by in the year immediately before the commissioning of the Kariba scheme by means of its importations of hydro-electric power from the Congo, which are now expected to begin in the second half of 1956 instead of 1957, and of its own present and planned expansion of thermal generating capacity.

The year has been more free from worry about fuel supplies than any year since the end of the war. To some extent this is due to an improvement in the rail position and perhaps to a greater extent to the fact that the strike in January and February this year enabled the mines to build up an unprecedented stock of coal. This has since been eaten into somewhat and the position is still not such as to warrant the total cessation of wood-burning.

WANKIE COLLIERY COMPANY LIMITED

(Incorporated in Southern Rhodesia)

LARGE INCREASE IN SALES

The 32nd annual general meeting of Wankie Colliery Company Limited will be held in Bulawayo on Monday, December 12.

The following is from the statement by the Chairman, **Mr. T. Coulter,** which has been circulated with the annual report and accounts for the year ended August 31, 1955:

Accounts

The Profit for the year after providing for depreciation, Debenture Interest, Debenture Trustees' fees, and Directors' emoluments, but before taxation, amounted to £1,084,012 as compared with £563,339 for the previous year, being an improvement of £520,673.

Taxation absorbed £260,000 and a sum of £165,000 was transferred to Taxation Equalisation Reserve. In accordance with the provisions of the Coal Price Agreement, an amount of £250,000 was transferred to General Reserve which now stands at £735,000.

Dividend No. 61 of 4½d. per share was paid in May, 1955, and the Directors have declared a further Dividend No. 62 of 6d. per share which will be paid on or about December 8, 1955, to shareholders registered at the close of business on November 2, 1955. The total distribution for the year of £386,094 represents 10½d. per share and compares with 9d. per share paid last year.

Capital Expenditure on fixed assets during the year, less sales, amounted to £1,724,115 and after making allowance for amortisation of coal mining rights and depreciation, the Balance Sheet shows Fixed Assets at August 31, 1955, at £7,454,856.

Current Assets (excluding Stocks and Stores) at £2,487,183 as against Current Liabilities of £940,839 indicate a surplus of £1,546,344 represented by Federal Government Stocks and short term loans and deposits. This surplus will be required to finance the balance of the large capital programme which we embarked upon two years ago.

Sales and Output

The following is a summary of sales of coal and coke for the year ended August 31, 1955, compared with the previous two years.

	1953 Tons	1954 Tons	1955 Tons
Coal	2,781,023	2,732,957	3,414,719
Coke	158,821	154,617	220,966

It is gratifying to note that coal sales for the year increased by 681,762 tons compared with the previous year and more than offset the temporary setback that occurred in 1954: coke sales also showed an increase of 66,349 tons.

Our development programme for coal production is well ahead of schedule, and the present capacity from the three collieries is already of the order of 4,500,000 sales tons of coal per annum, which is some 900,000 tons ahead of the existing coal-carrying capacity of the Rhodesia Railways. We have no doubts about honouring the guarantee we gave to the Government of Southern Rhodesia in 1953 that our output capacity would be raised to not less than 5,000,000 tons a year by the end of 1956. Our relations with the Railway Adminstration are close and cordial, and, while we acknowledge the improvement in the coal-carrying capacity during the last twelve months, there are still many railway problems to be overcome before we shall feel assured that all the coal we can produce can be transported and the demands of our consumers satisfied.

Price of Coal

In expectation of an improvement in the coal-carrying capacity of Rhodesia Railways during the current year, and the consequential improved efficiency which is so dependent thereon, we are reducing the average selling price for the current year by 5d. per ton to 18s 10d. per ton at pitsmouth.

Satisfactory progress has been made on the programme of development and reconstruction, and the next twelve months should see this scheme virtually completed. Two years ago it was estimated that the cost would be in the neighbourhood of £5,300,000. It is now more likely to approximate £6,000,000, but the additional funds can be found from our own resources and further capital issues are unlikely.

Copies of the annual report and accounts may be obtained from the London office of the company, 11 Old Jewry, E.C.2.

WAIHI INVESTMENTS & EXPLORATION, LIMITED

The Nineteenth Annual General Meeting of Waihi Investments and Exploration Limited was held at 48 Gresham Street, London, E.C.2, on Tuesday last.

The following is an extract from the statement by the Chairman, **Mr. G. R. Mitchison, C.B.E., Q.C., M.P.,** which was circulated with the report and accounts for the year ended December 31, 1954 :—

The accounts reflect several matters, which I mentioned in my speech at the last Annual General Meeting and to which I shall refer in this statement.

As I then mentioned, in March, 1954, Puket Tin Dredging Ltd. made a return of capital of 1s. 6d. a share out of the 5s. shares and the capital was re-divided into 2s. shares, of which this Company now holds 984,250 out of a total of 1,750,000. The money so received by this Company has been applied, as again I mentioned last year, to take over some of the outside indebtedness of Fluorspar Ltd., and to improve the liquid position of this Company by the repayment of the loan of £20,500, which appeared in the 1953 balance sheet, and by an increase of cash in hand.

Puket had a satisfactory year, in respect of which it declared dividends amounting to 35 per cent. or 8 2/5d. per share, less tax. These dividends are the principal source of the increase in the item of " Interest and Dividends on Investments " in the Profit and Loss Account of this Company. That increase has enabled us to declare a dividend of 10 per cent., less tax, paid on July 28 last, and to increase our carry forward by nearly £4,000.

During the present year, 1955, Puket has continued to show satisfactory results and, subject to the unforeseen, I expect that the final results will be comparable with those of 1954. It has so far declared, in respect of this year, dividends amounting to 25 per cent. or 6d. less tax. The prospective life of the dredging proposition at Puket is not long and, while it would be premature to make any definite forecast, provision is being made in the Puket accounts, as opportunity permits, to write down the property and plant and to put aside appropriate reserves.

Fluorspar Ltd. has continued to be a troublesome business, but with some continuing improvement in prospects and results. Once again a working profit was not enough to meet depreciation and interest on loans and debentures; but the deficiency was small. Production has been improving but there are still recurring elements of uncertainty in the treatment process. We owe much to Mr. Lowrie's skill and diligence and to the general competence shown by him and by some others at Stanhope. Sales, too, have improved and we have disposed of most of the accumulated stock, which I mentioned last year. On present prices, however, the margin of profit is small and at times uncertain. Generally, we are not yet quite satisfied with the results; but the more favourable trend, which began about two years ago, has been maintained in spite of some inevitable rises in costs.

I may add that the £10,000 increase in our loan to Fluorspar represents outside indebtedness taken over. Loans to Fluorspar from all sources were slightly reduced during 1954 and, with the disposal of stock, there has been some further improvement in Fluorspar's cash position. The third Note on this Company's Balance Sheet refers to a loan to Fluorspar, which has been repaid since the date of the accounts.

In 1954 Waihi Minerals Ltd., owned the lease of the Magpie Mine and of a smaller proposition at Wagerburn, near Stanhope. As I explained at the last Annual General Meeting, we ceased exploration at the Magpie Mine in March, 1954. There have been some negotiations with a view to other interests participating in the development of this property, but at present there is nothing further to report to shareholders. During 1955 Wagerburn has been transferred to Fluorspar against a payment of £2,100 for some machinery there and a further contingent payment, which will in any event be quite small. In all the circumstances we must face the fact that this Company's loan to Waihi Minerals is largely irrecoverable and there is a Note by the Directors to that effect in the Balance Sheet.

In Harrietville (Tronoh) Ltd. we have been, in effect, junior partners with companies of the Tronoh group. As I explained at the last Annual General Meeting, operations have ceased at Harrietville and the dredge was offered for sale. It has recently been sold at a price which, taking into account the estimated realisable value of other assets, should enable Harrietville (Tronoh) Ltd., to pay off its loans and possibly to make a very small distribution to shareholders. We have been repaid £40,000 of our loan and we expect to receive the remaining £14,350 of it in due course. We do not expect, however, to get more than about £2,000 back in respect of our shares, which are the " unquoted investments " shown in the Balance Sheet.

The report and accounts were adopted.

Company Shorts

Rhodesia Monteleo Continues on Care and Maintenance.—The Rhomonte Mine, owned by Rhodesia Monteleo Asbestos, remained on a care and maintenance basis during the year ended June 30, 1955, but expenditure over revenue decreased to £9,523 from £34,509. No doubt mainly responsible for this improvement has been the tribute arrangement under which the mine has recently been operated on a restricted basis. The adverse balance carried forward accordingly moved up to £62,376 from £52,853.

In his statement to shareholders Mr. J. Robinson, the chairman, stated that although demand for asbestos fibre had hardened during the year, prices remained low and offered no encouragement to re-open the mine in the foreseeable future.

Meeting, Salisbury, Rhodesia, December 9.

Coronation Sells Vubachikwe.—Group mine working profits of the Coronation Syndicate rose during the year ended June 30, 1955, to £191,561 from £162,049. Royalties received moved up to £4,088 from £3,101 while dividends gave £200 against £205.

Year to June 30	*Total Revenue*	*Taxation*	*Net Profit*	*Dividends*	*To Reserve*	*Carry Forward*
	£	£	£	£	£	£
1955	200,200	25,884	101,385	70,077	22,500	70,077
1954	171,001	32,206	62,970	60,375	44,219	71,692

The Coronation Syndicate owns five small gold mines in Southern Rhodesia, named Tebekwe, Butterfly, Venice, Arcturus and Muriel. The last mentioned of these has been operated on a tribute basis since December, 1953.

During the past financial year the Syndicate's Vubachikwe Mine was sold for a profit of £20,909.

Mr. J. H. Mitchell is chairman. Meeting, Johannesburg, December 5.

Sale of Assets Continues at Rosterman.—The sale of buildings, plant and machinery at Rosterman Gold Mines in East Africa proceeded satisfactorily during the year ended December 31, 1954. Some plant, together with a house, remained to be sold.

During the past financial year the company made a loss of £8,758 as compared with the previous loss of £9,113. After amounts written off and the addition of £11,601 from the sale of fixed assets, the adverse increased to £463,421 from £432,995.

Mr. A. H. Moreing is chairman. Meeting, London, Dec. 13.

R.S.T. Group's First Quarter's Returns.—The following table gives the Mufulira and Roan Antelope results for the September quarter, compared with the preceding three quarterly periods.

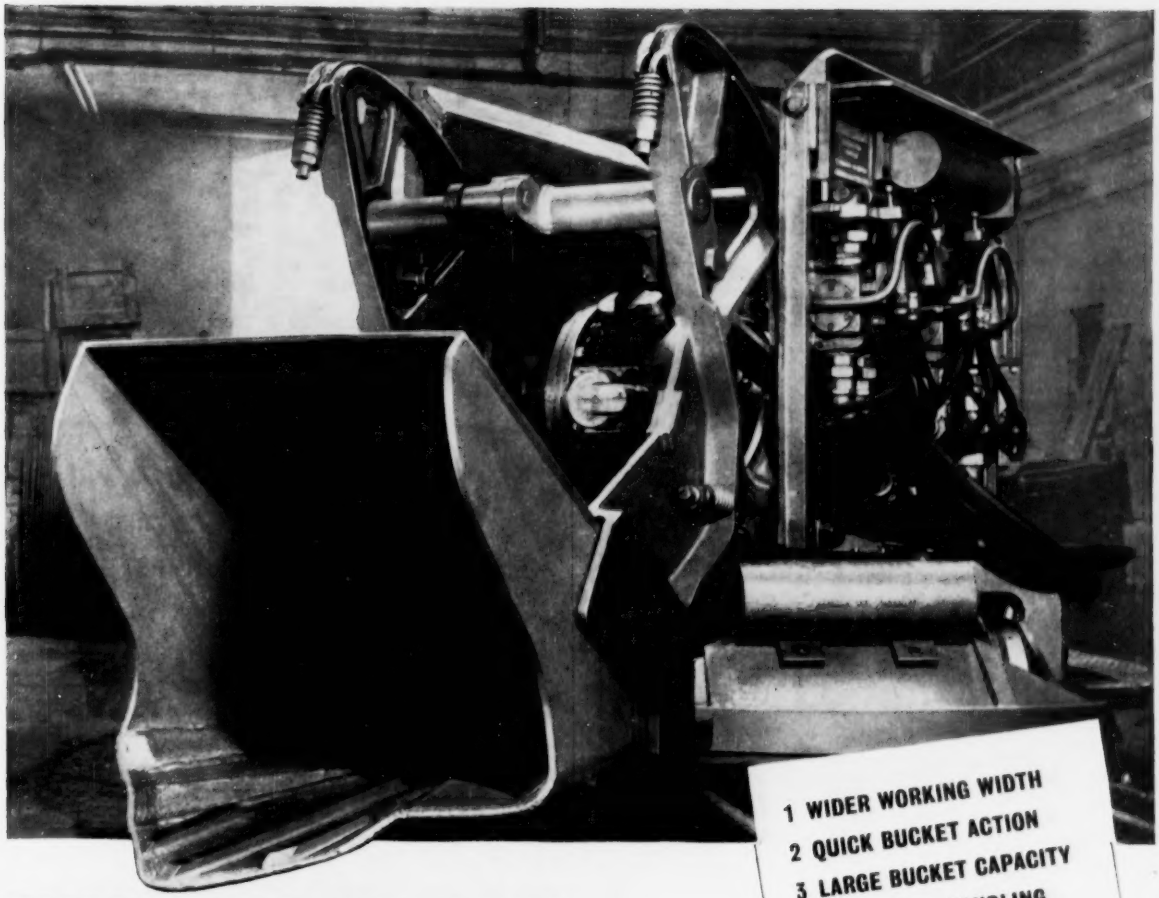
	Dec. Qtr. 1954	*Mar. Qtr. 1955*	*June Qtr. 1955*	*Sept. Qtr. 1955*
Mufulira	*(l.tons)*	*(l.tons)*	*(l.tons)*	*(l.tons)*
Sales	24,198	18,646	25,022	23,135
	(£000)	*(£000)*	*(£000)*	*(£000)*
Revenue	6,448	5,843	7,227	7,193
Costs	2,772	2,121	4,630	3,464
Difference in value of copper stocks	Dr. 110	Dr. 478	Cr. 463	Cr. 200
Surplus	3,566	3,244	3,060	3,929
Replacements*	267	196	201	264
Profit before taxation†	3,299	3,048	2,859	3,665
Roan Antelope	*(l.tons)*	*(l.tons)*	*(l.tons)*	*(l.tons)*
Sales	22,524	19,872	23,988	18,945
	(£000)	*(£000)*	*(£000)*	*(£000)*
Revenue	5,879	6,055	6,895	5,796
Costs	3,078	2,253	4,727	3,562
Difference in value of copper stocks	Cr. 152	Dr. 549	Cr. 467	Cr. 893
Surplus	2,953	3,253	2,635	3,127
Replacements*	199	185	152	147
Profit before taxation†	2,754	3,068	2,483	2,980

* Subject to revision when year's accounts considered. † Estimated.

CORRECT SOLUTION TO "UNICONE" CROSSWORD No. 12 APPEARING ON PAGE 627

ACROSS : 9, Operate; 10, Refrain; 11, Nurse; 12, Espionage; 15, Radiant; 17, Intent; 19, Tyneside; 21, Helium; 22, Cogent; 23, Stresses; 27, Nation; 30, Mediate; 32, Numbering; 33, Relic; 34, Tendril; 35, Plaints.

DOWN : 1, Moonlight Sonata; 2, Ferret; 3, Cavern; 4, Feted; 5, Prepay; 6, Ofnote; 7, Salami; 8, Interesting case; 13, Sitters in; 14, Innocent; 16, Atomiser; 18, Elide; 20, Sight; 24, Remind; 25, Smears; 26, Edible; 28, Aerial; 29, Inland; 31, Agape.



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THE RENONG TIN DREDGING COMPANY, LIMITED

SIR JOHN HAY'S STATEMENT

The 42nd Annual General Meeting of The Renong Tin Dredging Company, Limited, will be held on December 12 at 52/54 Gracechurch Street, London, E.C.3.

The following is the statement by the Chairman, **Sir John Hay**:

ACCOUNTS

The remainder of the high-yielding "Old Town" area at Rasa was worked out by No. 2 Dredge in the early months of the financial year. Though returns thereafter fell sharply, the results from this area represent the chief contribution to the Company's operational profit of £237,015 for the year—only £21,423 less than the exceptional earnings for 1953/54. After providing £137,646 for British and Malayan Income Tax and British Profits Tax, net profit amounted to £99,369. We recommend payment of a Final Dividend of 30%, less tax, making with the Interim Dividend of 15%, 45% less tax for the year, plus a Special Bonus Dividend of 20%, less tax. The distinction between the Dividend for the year and the Bonus itself implies that the latter concerns only the past year and is not an innovation with future implications.

Outstanding Taxation issues which mainly arose from War Damage Compensation have now been settled with the Inland Revenue Authorities. As a result, £80,000 of the Taxation Provision shown in last year's Balance Sheet has been released. This sum has been transferred to Reserve for Renewals of Equipment to which has also been added £10,000 from Profit and Loss Account raising this Reserve to £140,000. A substantial Reserve of this nature is desirable owing to the heavy cost, in these inflationary times, of major renewals to our Dredges. We are already contemplating the purchase of a complete new bucket line for No. 2 Dredge which suffered excessive wear and tear in digging up the roadways, building sites, ruins and rubbish in the Old Town area. With three Dredges in operation such renewals are liable to arise at irregular but not infrequent intervals. Now that the Renewals Reserve has been built up to a substantial figure, the Board consider that the Contingencies Reserve, in which £140,000 had been accumulated to end June, 1954, with similar objects in mind, should now be regarded as a General Reserve and so renamed. A further £10,000 has been added to this from the year's profits making the final total £150,000. After allowing for Dividends and the foregoing Allocations we carry forward a Credit Balance of £32,870 on Profit and Loss Account against £26,495 brought in.

MINING OPERATIONS

The position in the No 2 Dredge area at Rasa has already been made clear and it will be well understood that lower Tin content in the ground now being worked means lower outputs. The consequent diminution of earnings in the current year may be mitigated by an increase in yardage worked due to less onerous ground conditions, and the recent improvement in the price of Tin—if it holds. Negotiations with Government Departments are continuing in connection with the issue of Mining Titles over the Eastern extension at Rasa.

At the opposite end of the Rasa area, No. 3 Dredge which was rehabilitated and recommissioned in 1953 to work in tailings, has proved to be a profitable venture and, subject to the price of Tin, should continue to make a contribution to our revenue for a few years to come.

The Dredge at Jinjang worked throughout the year and made a substantial contribution to our earnings. A total of 766.6 tons of tin ore was produced, of which our one half share has been taken into the Company's accounts under the terms of our agreement with Straits Tinfields Ltd., our partners in this particular operation.

Every new mining enterprise produces its own crop of difficulties and Jinjang is no exception. Nevertheless it is a tribute to the mine management and crews that despite the nature of the problems revealed no prolonged stoppages occurred and the Dredge has stood up well to the arduous digging conditions with which it has to deal. We were well aware of the presence of clay but this has proved to be heavier,stiffer and stickier than had been estimated and is found to occur in beds of varying thickness throughout the alluvium so far encountered. The high proportion of this clay in the spoil retarded the rate of working and yardage treated was conseqnently below estimate and costs were adversely affected. Adjustments and improvements being made to the plant should result in a speeding up.

The acutely irregular limestone bedrock has also proved to be a greater obstacle than had been expected, and on many occasions prevented the Dredge from operating at estimated full depth. Redredging of selected patches is being planned which should result in further recoveries and provide data to guide future dredging policy.

The International Tin Regulation Agreement has yet to be ratified by the Governments of Indonesia and Siam on the producers' side, although the requisite number of consuming countries has agreed to participate. If and when regulation comes into operation, we shall be subject to a manipulated instead of a free market in tin, and controlled in place of unfettered production. In the opinion of the Renong Board the scheme is unnecessary and objectionable.

Our thanks are due to the Mine Superintendents and all our European and Asian Employees who, it is obvious from the results before you, are spurred by the problems that confront them and are not deterred by the disturbed conditions still prevalent particularly in the Rasa District. The Consulting Engineers, Messrs. Vallentine & Dunne, whose surveillance of operations and advice on mining policy is no light responsibility and our Agents in Kuala Lumpur, Guthrie & Co., Limited, also deserve our thanks and appreciation for their unremitting service.

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